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Right-of-Way

Plan of Development

ELDORADO-IVANPAH TRANSMISSION LINE PROJECT

Prepared for:

Bureau of Land Management

Prepared by:

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On behalf of:

Southern California Edison

October 2011

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LIST OF ACRONYMS

ACSR	Aluminum Conductor Steel Reinforced
APM	applicant proposed measure
ARPA	Archaeological Resources Protection Act Training
BLM	Bureau of Land Management
BMP	Best Management Practices
Caltrans	California Department of Transportation
CCDOA	Clark County Department of Aviation
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CMP	corrugated metal pipe
CPUC	California Public Utilities Commission
CRHR	California Register of Historic Resources
CUPA	Certified Unified Program Agency
DC	direct current
DESCP	Drainage, Erosion, and Sedimentation Control Plan
EHS	extra high strength
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement
GO	General Order
HAER	Historic American Engineering Record
HMBP	Hazardous Materials Business Plan

I-15	Interstate 15
ISEGS	Ivanpah Solar Electric Generating System
kcmil	kilo circular mils
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LST	lattice steel tower
LWS	light-weight steel
MEER	mechanical electrical equipment room
MLD	most likely descendant
MM	mitigation measure
MVA	megavolt ampere
MW	megawatt
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NDOW	Nevada Department of Wildlife
NRHP	National Register of Historic Places
OHGW	overhead ground wire
OPGW	optical ground wire
OSHA	Occupational Safety and Health Administration
PEA	Proponents Environmental Assessment
POD	Plan of Development
PRMP	Paleontological Resource Management Plan
RPS	Renewables Portfolio Standard
RRRP	Reclamation, Restoration, and Revegetation Plan
RWQCB	Regional Water Quality Control Board

SCE	Southern California Edison Company
SNSA	Southern Nevada Supplemental Airport
SWPPP	Stormwater Pollution Prevention Plan
TSP	tubular steel pole
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WEAP	Worker Environmental Awareness Program

OVERVIEW OF PURPOSE AND NEED

OVERVIEW

This Plan of Development (POD) has been prepared to describe Southern California Edison Company's (SCE) proposal to construct a new 220-kilovolt (kV) to 115-kV substation, a new bundled double-circuit 220-kV transmission line, a new portion of an existing 115-kV subtransmission line, an extension of an existing 33-kV distribution line, and a new telecommunication system within both California and Nevada (See Jurisdiction and Ownership Map, Figure 1). In April 2010, the Bureau of Land Management (BLM) prepared a Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/FEIS) (BLM 2010) for this project.

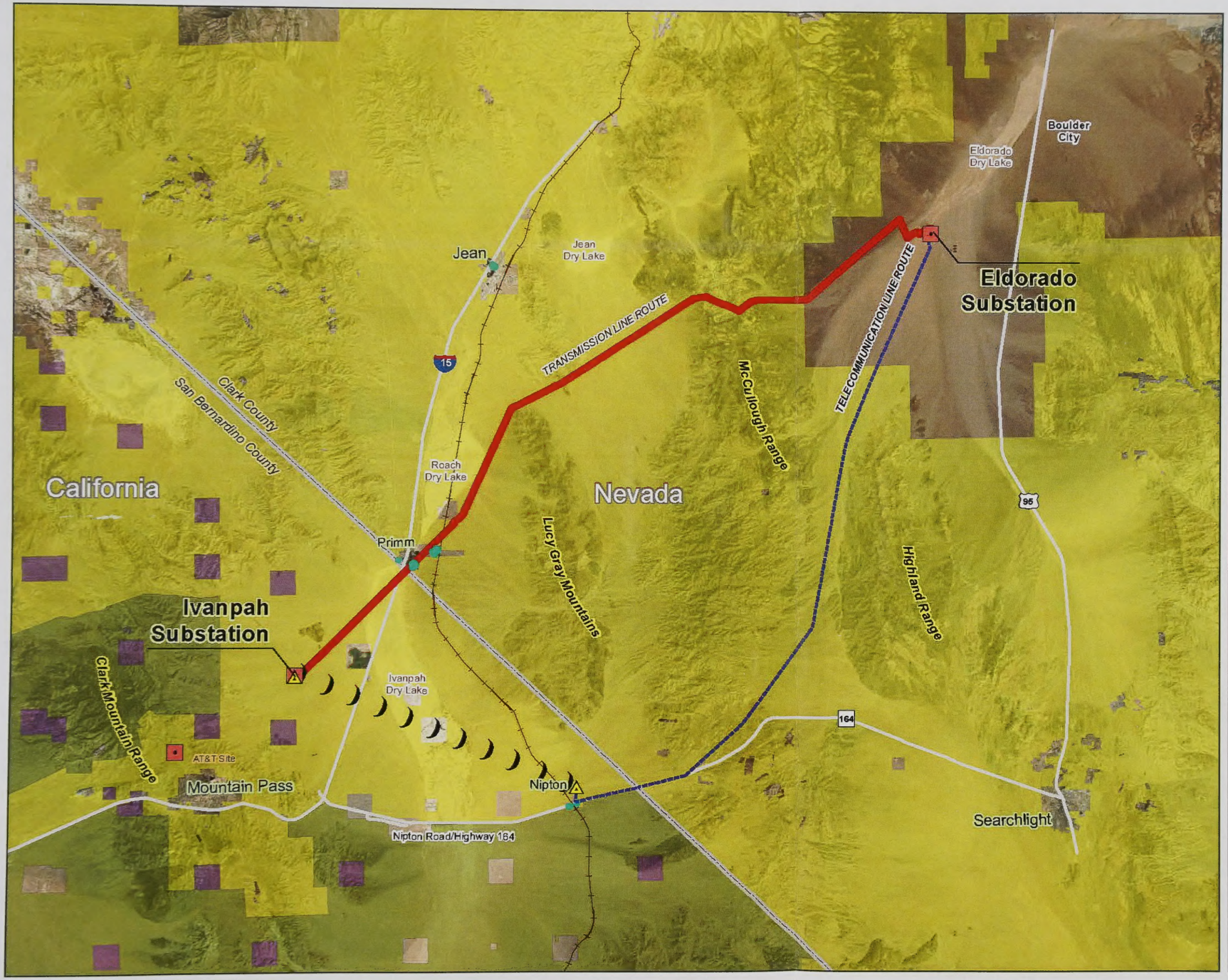
The new Ivanpah Substation will include 220-kV and 115-kV switchracks and will be located in California, near Primm, Nevada (See Project Map, Figure 2). The 220-kV transmission line will be approximately 35 miles long, of bundled double-circuit construction, and will be located between the existing SCE Eldorado Substation in Nevada and the Ivanpah Substation in California. The Eldorado-Ivanpah portion of the existing SCE Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line will be removed and replaced with the 220-kV transmission line. Removal of the existing 115-kV transmission line, construction of both the new 220-kV transmission line and the Ivanpah Substation, modifications at the existing Eldorado Substation, and construction of a telecommunication system are hereafter referred to as the "project."

The telecommunication system will consist of two fully diverse and redundant telecommunication paths, and will include: (1) Path 1 – placement of approximately 35 miles of new optical ground wire (OPGW) along the Eldorado-Ivanpah 220-kV transmission line from the Eldorado Substation to the Ivanpah Substation; and (2) Path 2 – replacement of an overhead ground wire (OHGW) with OPGW on an approximate 25-mile section of the existing SCE Eldorado-Lugo 500-kV transmission line, and installation of approximately 5 miles of fiber optic cable in an underground duct from the Eldorado-Lugo transmission line to the town of Nipton. Path 2 will then follow a route from the town of Nipton to the Ivanpah Substation, on a preferred microwave path. For the early interconnect phase of the project, one additional fiber optic path is required for connection to the local telecom carrier at Mountain Pass. Approximately 8 miles of All Dielectric Self Supporting fiber optic cable will be installed on the existing transmission structures.

The project also includes changes inside the Eldorado Substation to accommodate the new 220-kV lines. This project description is based on planning-level assumptions, and exact details will be determined following completion of preliminary and final engineering; identification of field conditions; availability of labor, material, and equipment; and compliance with applicable environmental and permitting requirements.

Eldorado-Ivanpah Transmission Project

Figure 1
Jurisdiction and Ownership



LEGEND

- Substations
- Microwave Tower
- Laydown Yards
- Transmission Line Route
- Telecommunication Line Route
- Railroads
- Streets/Highways
- State Boundary
- Populated Places
- Mojave National Preserve
- State
- Bureau of Land Management
- Microwave Signal

0 2 4 Miles
0 2 4 Kilometers
1:240,000 1 inch = 20,000 feet

SCE Corp Environment, Health & Safety
Eldorado-Ivanpah Transmission Project
Projection: NAD 83 UTM Zone 11N
Date: 10/4/2011

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PURPOSE AND NEED

As part of the Renewable Energy Transmission Initiative, the Ivanpah Dry Lake Area (mostly under BLM jurisdiction; see Figure 1) has been identified to be a rich solar resource area in the State of California. The construction of new transmission lines and facilities will help facilitate the interconnection of this potential solar resource. The primary objective of the new transmission lines and facilities, together with existing facilities, is to deliver up to 1,400 megawatts (MW) of renewable energy produced from the Ivanpah Dry Lake Area to utility load centers.

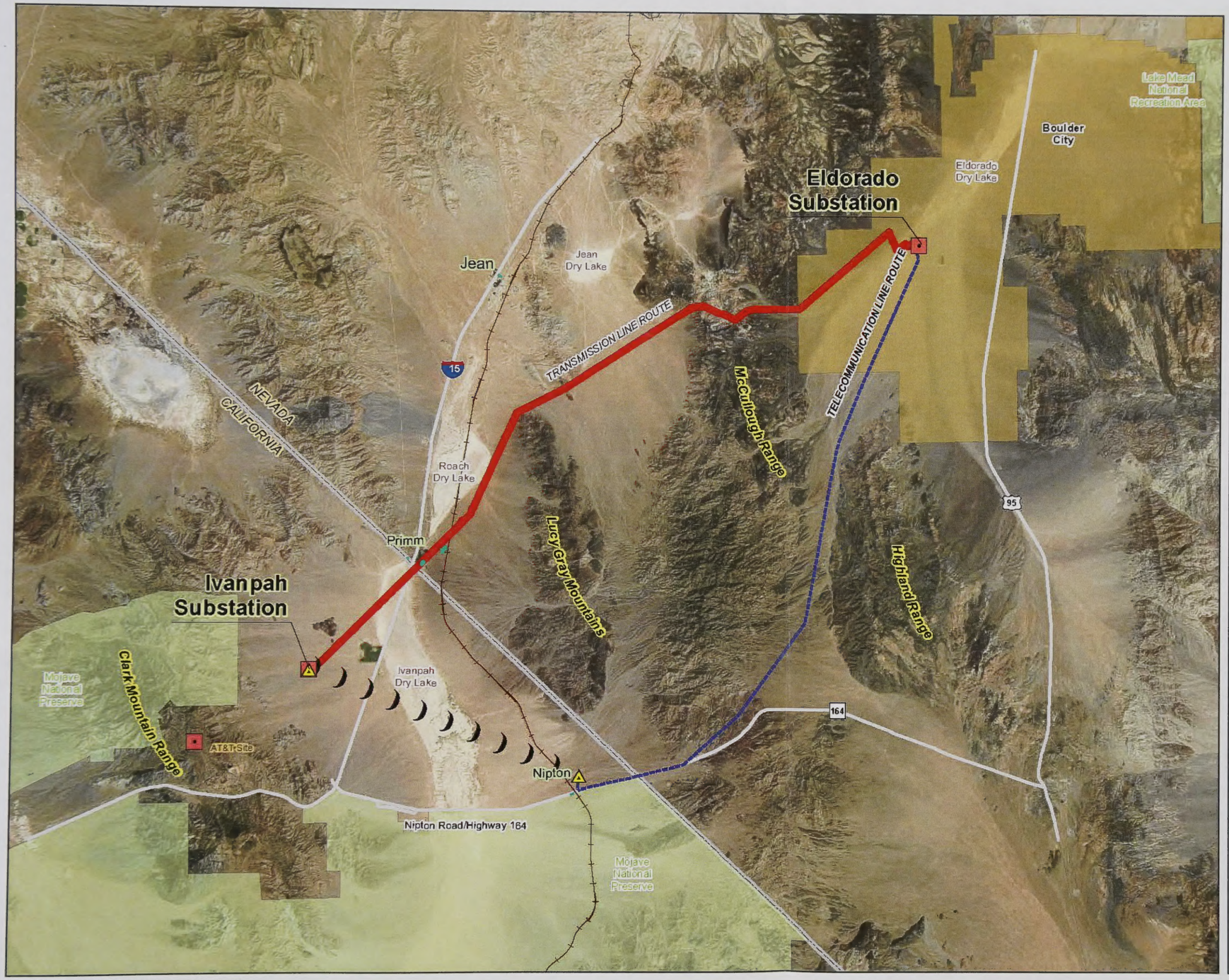
The project consists of a new, approximately 35-mile bundled double-circuit 220-kV transmission line between the Ivanpah Dry Lake Area and the existing Eldorado Substation, and the construction of a new Ivanpah 220/115-kV Substation. As discussed below, the project is needed in order to:

1. Help SCE comply with the state-mandated Renewables Portfolio Standard (RPS) in an orderly, rational, and cost-effective manner, while also considering the need for maintaining reliable electric service during the upgrade and/or construction of new facilities.
2. Integrate planned renewable generation resources, including up to 1,400 MW from the Ivanpah Dry Lake Area with a Power Purchase Agreement, executed by the California Public Utilities Commission (CPUC) jurisdictional Private Transmission Owners, in a manner that minimizes potential environmental impacts and impacts to existing and planned residences, where feasible, by maximizing the use of existing transmission corridors in order to:
   a. maximize the use of existing, previously disturbed transmission line right-of-ways to minimize effect on previously undisturbed land and resources.
   b. select route and tower locations with the lowest potential for environmental impacts while still meeting project objectives.
   c. select the shortest feasible route that minimizes environmental impacts and project costs.
3. Interconnect and deliver energy from up to 1,400 MW of renewable resources located in the Ivanpah Dry Lake Area in a way that complies with all applicable North American Electric Reliability Corporation/Western Electric Coordinating Council Planning Standards, and in a manner that minimizes transmission line crossings. (These renewable resources are being planned by independent power producers in response to the state-mandated RPS. Consequently, the energy is expected to supplant energy deliveries from existing non-renewable resources.)
4. Support the State of California Greenhouse Gas Reduction Program.
5. Assist the BLM in meeting the federal directive to develop 10,000 MW of renewable generation.

More detailed information on the purpose and need can be found in the Eldorado-Ivanpah Transmission Line Project FEIR/FEIS (BLM 2010).

Eldorado-Ivanpah Transmission Project

Figure 2
Project Map



LEGEND

- Substations
- Microwave Tower
- Laydown Yards
- Transmission Line Route
- Telecommunication Line Route
- Railroads
- Streets/Highways
- State Boundary
- Mojave National Preserve
- Microwave Signal

0 2 4 Miles

0 2 4 Kilometers

1:250,000 1 inch = 20,833 feet

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PURPOSE AND NEED

As part of the Renewable Energy Transmission Initiative, the Ivanpah Dry Lake Area (mostly under BLM jurisdiction; see Figure 1) has been identified to be a rich solar resource area in the State of California. The construction of new transmission lines and facilities will help facilitate the interconnection of this potential solar resource. The primary objective of the new transmission lines and facilities, together with existing facilities, is to deliver up to 1,400 megawatts (MW) of renewable energy produced from the Ivanpah Dry Lake Area to utility load centers.

The project consists of a new, approximately 35-mile bundled double-circuit 220-kV transmission line between the Ivanpah Dry Lake Area and the existing Eldorado Substation, and the construction of a new Ivanpah 220/115-kV Substation. As discussed below, the project is needed in order to:

1. Help SCE comply with the state-mandated Renewables Portfolio Standard (RPS) in an orderly, rational, and cost-effective manner, while also considering the need for maintaining reliable electric service during the upgrade and/or construction of new facilities.
2. Integrate planned renewable generation resources, including up to 1,400 MW from the Ivanpah Dry Lake Area with a Power Purchase Agreement, executed by the California Public Utilities Commission (CPUC) jurisdictional Private Transmission Owners, in a manner that minimizes potential environmental impacts and impacts to existing and planned residences, where feasible, by maximizing the use of existing transmission corridors in order to:
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   b. select route and tower locations with the lowest potential for environmental impacts while still meeting project objectives.
   c. select the shortest feasible route that minimizes environmental impacts and project costs.
3. Interconnect and deliver energy from up to 1,400 MW of renewable resources located in the Ivanpah Dry Lake Area in a way that complies with all applicable North American Electric Reliability Corporation/Western Electric Coordinating Council Planning Standards, and in a manner that minimizes transmission line crossings. (These renewable resources are being planned by independent power producers in response to the state-mandated RPS. Consequently, the energy is expected to supplant energy deliveries from existing non-renewable resources.)
4. Support the State of California Greenhouse Gas Reduction Program.
5. Assist the BLM in meeting the federal directive to develop 10,000 MW of renewable generation.

More detailed information on the purpose and need can be found in the Eldorado-Ivanpah Transmission Line Project FEIR/FEIS (BLM 2010).

1.0 RIGHT-OF-WAY LOCATION

1.1 RIGHT-OF-WAY DESCRIPTION

Approximately 35 miles of the existing SCE Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line will be removed and replaced with the 220-kV bundled double-circuit Eldorado-Ivanpah transmission line, mostly within the existing right-of-way between Eldorado Substation in Nevada and the to-be constructed Ivanpah Substation in California. The Eldorado-Ivanpah 220-kV transmission line route begins at the existing Eldorado Substation (see Figure 2). The Eldorado-Ivanpah 220-kV line will exit the substation to the north within the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line right-of-way. The line will head generally in a westerly direction on the existing right-of-way and will cross beneath six existing Los Angeles Department of Water and Power (LADWP) transmission lines. These LADWP transmission lines include:

1. Mead-Victorville #1 287-kV transmission line, between Milepost 0-1 and at Milepost 26-27.
2. McCullough-Victorville #1 500-kV transmission line, between Milepost 0-1 and between Milepost 25-26.
3. McCullough-Victorville #2 500-kV transmission line, between Milepost 0-1 and at Milepost 26-27.
4. Marketplace-Adelanto 500-kV transmission line, between Milepost 1-2.
5. Intermountain-Adelanto 1,000-kV transmission line, between Milepost 7-8 and Milepost 12-13.
6. McCullough/Victorville#1 500-kV circuit.
7. McCullough/Victorville#2 500-kV circuit.
8. Mead/Victorville 287-kV circuit.

The SCE existing 70-foot right-of-way will need to be widened to a minimum of 100 feet, and where possible, to 130 feet to accommodate construction and maintenance of the Eldorado-Ivanpah 220-kV transmission line. At all LADWP transmission line crossings identified above, a 250-foot right-of-way will be required to accommodate the side-by-side single-circuit 220-kV steel H-frame structures (Side-by-side Single-circuit 220-kV Steel H-frame Structures, Figure 3).

In order to eliminate two LADWP crossings and minimize construction-related concerns at Milepost 11, approximately 0.4 miles of the Eldorado-Ivanpah 220-kV line will not follow the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line right-of-way. At this location, preliminary design has placed structures north of the existing LADWP Intermountain/Adelanto 1,000-kV direct current (DC) circuit. Similarly, to cross perpendicular and support available wire pulling/tensioning locations identified through preliminary design, the Eldorado/Ivanpah 220-kV transmission line will deviate from the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line right-of-way at Milepost 12 for approximately 0.7 miles. At structure 89, the Eldorado-Ivanpah

220-kV transmission line will re-enter and remain within the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass115-kV right-of-way until it reaches the Ivanpah Substation.

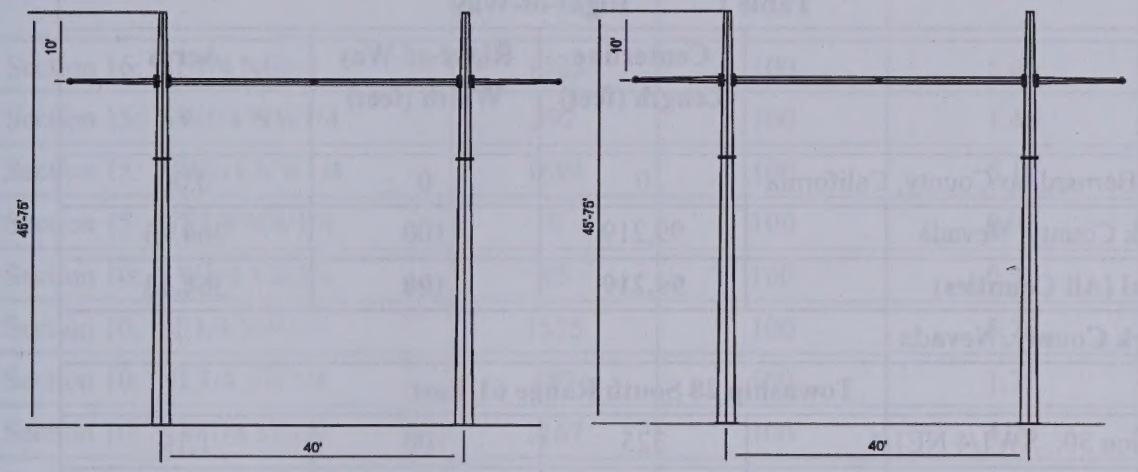

Figure 3 Side-by-side Single-circuit 220-kV Steel H-frame Structures

The line will continue south-west for approximately 13 miles (Milepost 24.8) before crossing over one existing 115-kV transmission line and under the LADWP's McCullough-Victorville #1 and McCullough-Victorville #2 500-kV transmission lines, and the Mead-Victorville 287-kV transmission line. At the crossing of the second and third 500-kV transmission lines (McCullough-Victorville #2 500-kV transmission line and the Mead-Victorville 287-kV transmission line), there is not adequate space to widen the existing right-of-way for side-by-side 220-kV steel H-frame structures. As required on the previous crossing, the new line must be rerouted along the north side of the McCullough-Victorville #2 500-kV transmission line, turn toward the south and cross under the Mead-Victorville 287-kV transmission line, then turn west to rejoin the existing right-of-way. The line will continue on the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV right-of-way for another 7.8 miles, into the Ivanpah Substation. The route will terminate at Ivanpah Substation.

To satisfy redundancy requirements in project communications, OPGW segments will be installed on both the Eldorado-Ivanpah 220-kV transmission line structures, and along 25 miles of the existing Eldorado-Lugo 500-kV transmission line. This OPGW installation will be performed in the same manner as the conductor installation. OPGW is typically installed in continuous segments, depending on various factors including line direction, inclination, and accessibility. For telecommunication installation along the new 220-kV line, the pulling and tensioning sites will be the same as those for the 220-kV conductor installation. For telecommunication installation along the existing 500-kV line, the stringing activities will be conducted for the OPGW installation only and will take place at discreet locations along the route. It is anticipated that approximately seven of the existing 500-kV towers will need to be modified to accommodate the new OPGW.

1.2 LEGAL DESCRIPTION

The following is the legal description of the project.

Table 1 Right-of-Way			
	Centerline Length (feet)	**Right-of-Way Width (feet)**	**Acres**
San Bernardino County, California	0	0	0.00
Clark County, Nevada	99,219	100	364.43
Total (All Counties)	**99,219**	**100**	**364.43**
Clark County, Nevada			
Township 28 South Range 61 East			
Section 30: SW1/4 NE1/4	325	100	1.19
Section 30: SE1/4 NE1/4	147	100	0.54
Section 30: NW1/4 NE1/4	0	100	0.002
Section 30: NE1/4 NE1/4	1605	100	5.89
Section 29: NW1/4 NW1/4	417	100	1.53
Section 20: SW1/4 SW1/4	1141	100	4.26
Section 20: SE1/4 SW1/4	569	100	2.03
Section 20: NE1/4 SW1/4	979	100	3.59
Section 20: NW1/4 SE1/4	1065	100	3.92
Section 20: SW1/4 NE1/4	684	100	2.50
Section 20: SE1/4 NE1/4	1356	100	4.99
Section 20: NE1/4 NE1/4	413	100	1.51
Section 21: NW1/4 NW1/4	1598	100	5.88
Section 21: NE1/4 NW1/4	0	100	0.001
Section 16: SW1/4 SW1/4	151	100	0.55
Section 16: SE1/4 SW1/4	1782	100	6.50
Section 16: SW1/4 SE1/4	77	100	0.33
Section 16: NE1/4 SW1/4	0	100	0.04
Section 16: NW1/4 SE1/4	1715	100	6.25
Section 16: NE1/4 SE1/4	297	100	1.09

Table 1 Right-of-Way			
	Centerline Length (feet)	Right-of-Way Width (feet)	Acres
Section 16: SE1/4 NE1/4	1525	100	5.60
Section 15: SW1/4 NW1/4	397	100	1.46
Section 15: NW1/4 NW1/4	1694	100	6.19
Section 15: NE1/4 NW1/4	0	100	0.03
Section 10: SW1/4 SW1/4	95	100	0.37
Section 10: SE1/4 SW1/4	1575	100	5.76
Section 10: NE1/4 SW1/4	489	100	1.79
Section 10: NW1/4 SE1/4	1167	100	4.29
Section 10: SW1/4 NE1/4	853	100	3.13
Section 10: SE1/4 NE1/4	790	100	2.91
Section 10: NE1/4 NE1/4	1187	100	4.35
Section 11: NW1/4 NW1/4	456	100	1.68
Section 2: SW1/4 SW1/4	1690	100	6.09
Section 2: SE1/4 SW1/4	0	100	0.12
Section 2: NW1/4 SW1/4	18	100	0.18
Section 2: NE1/4 SW1/4	1678	100	6.05
Section 2: SE1/4 NW1/4	483	100	1.77
Section 2: SW1/4 NE1/4	1209	100	4.44
Section 2: GOV'T LOT 2	924	100	3.39
Section 2: GOV'T LOT 1	767	100	2.82
Township 27 South Range 61 East			
Section 35: SE1/4 SE1/4	1336	100	4.90
Section 36: SW1/4 SW1/4	396	100	1.46
Section 36: NW1/4 SW1/4	1548	100	5.68
Section 36: NE1/4 SW1/4	176	100	0.65
Section 36: SE1/4 NW1/4	1710	100	6.27
Section 36: SW1/4 NE1/4	0	100	0.01
Section 36: NE1/4 NW1/4	125	100	0.46

Table 1 Right-of-Way			
	Centerline Length (feet)	**Right-of-Way Width (feet)**	**Acres**
Section 36: NW1/4 NE1/4	1575	100	5.78
Section 25: SW1/4 SE1/4	497	100	1.82
Section 25: SE1/4 SE1/4	1203	100	4.42
Section 25: NE1/4 SE1/4	902	100	3.31
Township 27 South Range 62 East			
Section 30: GOV'T LOT 3	711	100	2.61
Section 30: GOV'T LOT 1	1364	100	5.01
Section 30: GOV'T LOT 1	1368	100	5.03
Section 19: GOV'T LOT 4	1263	100	4.64
Section 19: GOV'T LOT 3	861	100	3.16
Section 19: NE1/4 SW1/4	405	100	1.49
Section 19: SE1/4 NW1/4	1280	100	4.70
Section 19: NE1/4 NW1/4	1285	100	4.72
Section 18: SE1/4 SW1/4	1276	100	4.69
Section 18: NE1/4 SW1/4	1275	100	4.68
Section 18: SE1/4 NW1/4	554	100	2.03
Section 18: SW1/4 NE1/4	733	100	2.70
Section 18: NW1/4 NE1/4	1284	100	4.72
Section 7: SW1/4 SE1/4	1273	100	4.68
Section 7: NW1/4 SE1/4	1274	100	4.68
Section 7: SW1/4 NE1/4	1275	100	4.43
Section 7: SE1/4 NE1/4	0	100	0.26
Section 7: NW1/4 NE1/4	46	100	0.43
Section 7: NE1/4 NE1/4	1228	100	4.25
Section 6: SE1/4 SE1/4	1305	100	4.79
Section 6: NE1/4 SE1/4	1305	100	4.79
Section 6: SE1/4 NE1/4	1324	100	4.86
Section 6: GOV'T LOT 1	1342	100	4.93

Table 1 Right-of-Way			
	Centerline Length (feet)	Right-of-Way Width (feet)	Acres
Township 26 South Range 62 East			
Section 31: GOV'T LOT 17	0	100	0.24
Section 31: GOV'T LOT 16	993	100	3.41
Section 31: GOV'T LOT 15	1343	100	4.93
Section 31: NE1/4 SE1/4	1343	100	4.93
Section 31: SE1/4 NE1/4	1343	100	4.93
Section 31: NE1/4 NE1/4	1343	100	4.93
Section 30: SE1/4 SE1/4	537	100	1.97
Section 29: SW1/4 SW1/4	807	100	2.97
Section 29: NW1/4 SW1/4	1343	100	4.93
Section 29: SW1/4 NW1/4	1348	100	4.95
Section 29: NW1/4 NW1/4	1349	100	4.95
Section 20: SW1/4 SW1/4	1349	100	4.95
Section 20: SE1/4 SW1/4	0	100	0.004
Section 20: NW1/4 SW1/4	350	100	1.29
Section 20: NE1/4 SW1/4	998	100	3.66
Section 20: SE1/4 NW1/4	1358	100	4.99
Section 20: NE1/4 NW1/4	1358	100	4.99
Section 17: SE1/4 SW1/4	1209	100	4.44
Section 17: SW1/4 SE1/4	218	100	0.80
Section 17: NE1/4 SW1/4	0	100	0.00
Section 17: NW1/4 SE1/4	1433	100	5.26
Section 17: SW1/4 NE1/4	1433	100	5.26
Section 17: NW1/4 NE1/4	295	100	1.08
Section 17: NE1/4 NE1/4	1140	100	4.19
Section 8: SE1/4 SE1/4	1431	100	5.25
Section 8: NE1/4 SE1/4	795	100	2.92
Section 9: NW1/4 SW1/4	642	100	2.36

Table 1 Right-of-Way			
	Centerline Length (feet)	**Right-of-Way Width (feet)**	**Acres**
Section 9: SW1/4 NW1/4	1437	100	5.28
Section 9: NW1/4 NW1/4	1230	100	4.52
Section 9: NE1/4 NW1/4	207	100	0.76
Section 4: SW1/4 SW1/4	0	100	0.00
Section 4: SE1/4 SW1/4	1437	100	5.28
Section 4: NE1/4 SW1/4	1437	100	5.28
Section 4: SE1/4 NW1/4	224	100	0.82
Section 4: SW1/4 NE1/4	1214	100	4.46
Section 4: GOV'T LOT 6	1458	100	5.36
Total	**99,219**	**100**	**364.43**

Table 2 Proposed Route: Pulling\Stringing Location		
		Acres
San Bernardino County, California		16.46
Clark County, Nevada		25.71
Total (All Counties)		**42.17**
Clark County, Nevada		
Township 25 South Range 61 East		
Section 23: SE1/4 NE1/4		2.69
Section 22: NE1/4 SW1/4		0.51
Section 22: SE1/4 SW1/4		0.42
Section 20: NW1/4 NE1/4		0.36
Section 20: SW1/4 NE1/4		0.32
Section 20: SE1/4 NW1/4		0.71
Section 20: SE1/4 NW1/4		0.30
Section 20: SW1/4 NE1/4		1.04
Section 20: SE1/4 NW1/4		0.59

Section 30: GOV'T LOT 1		0.34
Township 25 South Range 60 East		
Section 26: SW1/4 SE1/4		2.24
Section 35: NW1/4 NE1/4		0.12
Section 34: SE1/4 SW1/4		0.34
Section 04: SE1/4 NW1/4		0.62
Section 04: NE1/4 SW1/4		0.54
Section 04: NW1/4 SW1/4		0.22
Section 04: NW1/4 SW1/4		1.38
Section 07: NW1/4 NE1/4		0.34
Township 26 South Range 59 East		
Section 12: NW1/4 SE1/4		1.02
Section 12: NW1/4 SE1/4		0.50
Section 13: SW1/4 SW1/4		0.33
Section 24: NW1/4 NW1/4		0.02
Section 26: SE1/4 NW1/4		2.72
Section 34: NE1/4 SE1/4		0.14
Section 34: NE1/4 SE1/4		0.50
Section 34: NE1/4 SE1/4		1.15
Section 34: NE1/4 SE1/4		0.58
Section 34: NW1/4 SE1/4		0.38
Township 27 South Range 59 East		
Section 03: GOV'T LOT 3		0.81
Section 03: GOV'T LOT 3		1.54
Section 03: GOV'T LOT 3		0.50
Section 03: GOV'T LOT 3		0.50
Section 03: GOV'T LOT 3		0.25
Section 03: SE1/4 NW1/4		0.25
Section 03: SE1/4 NW1/4		1.44
Total		**25.71**
San Bernardino County, California		

Township 17 South Range 15 East		
Section 17: GOV'T LOT 5		1.30
Section 17: GOV'T LOT 5		1.90
Section 17: SE1/4 NW1/4		0.17
Section 18: NE1/4 SE1/4		1.38
Section 18: NE1/4 SE1/4		0.84
Section 18: SE1/4 SE1/4		0.53
Township 17 South Range 14 East		
Section 24: NE1/4 SE1/4		0.34
Section 25: SW1/4 NW1/4		0.05
Section 26: SE1/4 NE1/4		0.66
Section 26: NE1/4 SE1/4		2.12
Section 34: SE1/4 NE1/4		0.34
Township 16 South Range 14 East		
Section 03: GOV'T LOT 3		0.09
Section 03: GOV'T LOT 4		1.27
Section 03: GOV'T LOT 4		2.05
Section 03: GOV'T LOT 4		0.03
Section 03: SW1/4 NW1/4		1.34
Section 03: GOV'T LOT 4		1.30
Section 04: GOV'T LOT 1		0.75
Total		**16.46**

Table 3	**Proposed Route: Overhead Distribution Line**	
	Dimension	**Acres**
San Bernardino Meridian	20	.85
Township 16 North Range 16 East		
Section 28: Lot 2		
Section 33: NWNW		

Table 4 Proposed Route: Buried Telecom Route (Redundant path outside existing Eldorado-Lugo Right-of-Way		
	Dimension	**Acres**
San Bernardino Meridian	25-50 feet	28.3
Township 16 North Range 16 East		
Section 26: Lot 5		
Section 28: Lot 2		
Section 33: S2NE, SENW and NWNW		
Section 34:Lot 3, N2NE and S2NW		
Section 35: Lots 5 and 9, and N2NW.		

Table 5 Proposed Route: Nipton Microwave Tower location		
	Dimension	**Acres**
San Bernardino Meridian	100x100	.23
Township 16 North Range 16 East		
Section 28: Lots 2 and 3, inclusive		

1.3 SITE-SPECIFIC ENGINEERING SURVEYS

Site-specific engineering surveys will be conducted during final design and engineering. Preliminary engineering has been completed and the results are discussed in Section 2.0.

1.4 MAPS AND DRAWINGS

Preliminary engineering/design maps and drawings that provide the design and location of the transmission line have been completed for the project.

2.0 FACILITY DESIGN FACTORS

Details on structures and line components described are based on planning-level assumptions, preliminary design and may change following completion of final engineering; identification of field conditions; availability of labor, material, and equipment; and any environmental and permitting requirements.

2.1 TRANSMISSION FACILITIES

For the route, approximately 193 dulled galvanized double-circuit 220-kV lattice steel towers (LST) and approximately 36 dulled galvanized 220-kV single-circuit steel H-Frame structures will be installed. Elevation views of the towers are provided in Figure 4 and Figure 5. The estimated number and type of structures are presented in Table 6.

As part of the diverse telecommunication route, approximately 25 miles of the existing Lugo-Eldorado 500-kV transmission line will need to have one of the two existing 0.5-inch steel ground wires replaced with OPGW. It is estimated that approximately seven structures along this route will require structural modifications at the static peaks or middle to upper body, or both, to accommodate the replacement. This work is required to support the diverse telecommunications system.

Table 6 Ivanpah Transmission Line Summary

	220-kV Transmission Line Summary*
Length of Line (miles)	35
Existing Transmission Line Right-of-Way (miles)	35
New Transmission Line Right-of-Way (miles)	35
Span length (typical tower spacing, feet)	900
New Double-Circuit LST	193
New Single Circuit H-Frame Structures	36
New Permanent Area Occupied (acres)	39
New Temporary Area Occupied (acres)	375
* All numbers are approximate	

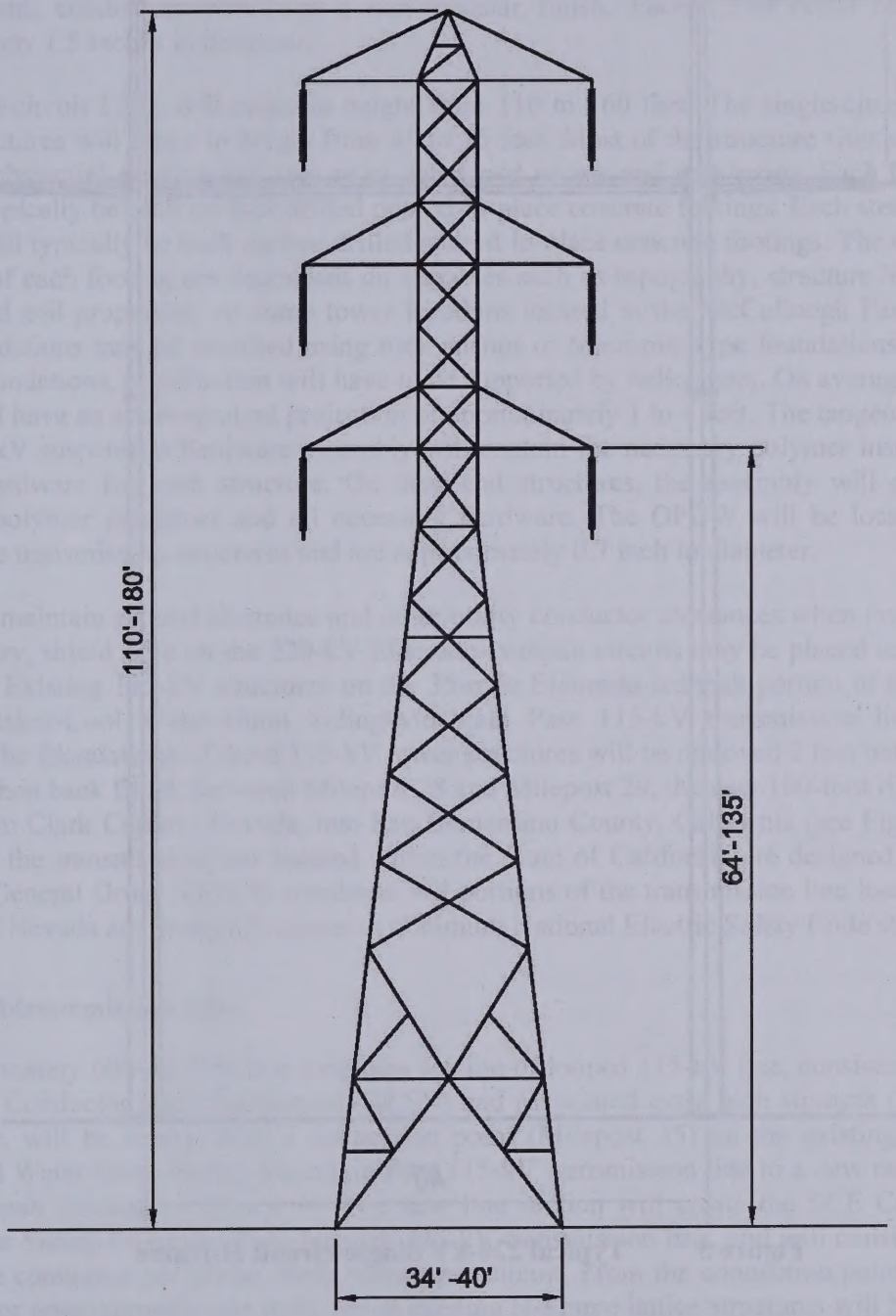

Figure 4 Typical 220-kV Double-circuit Lattice Steel Tower

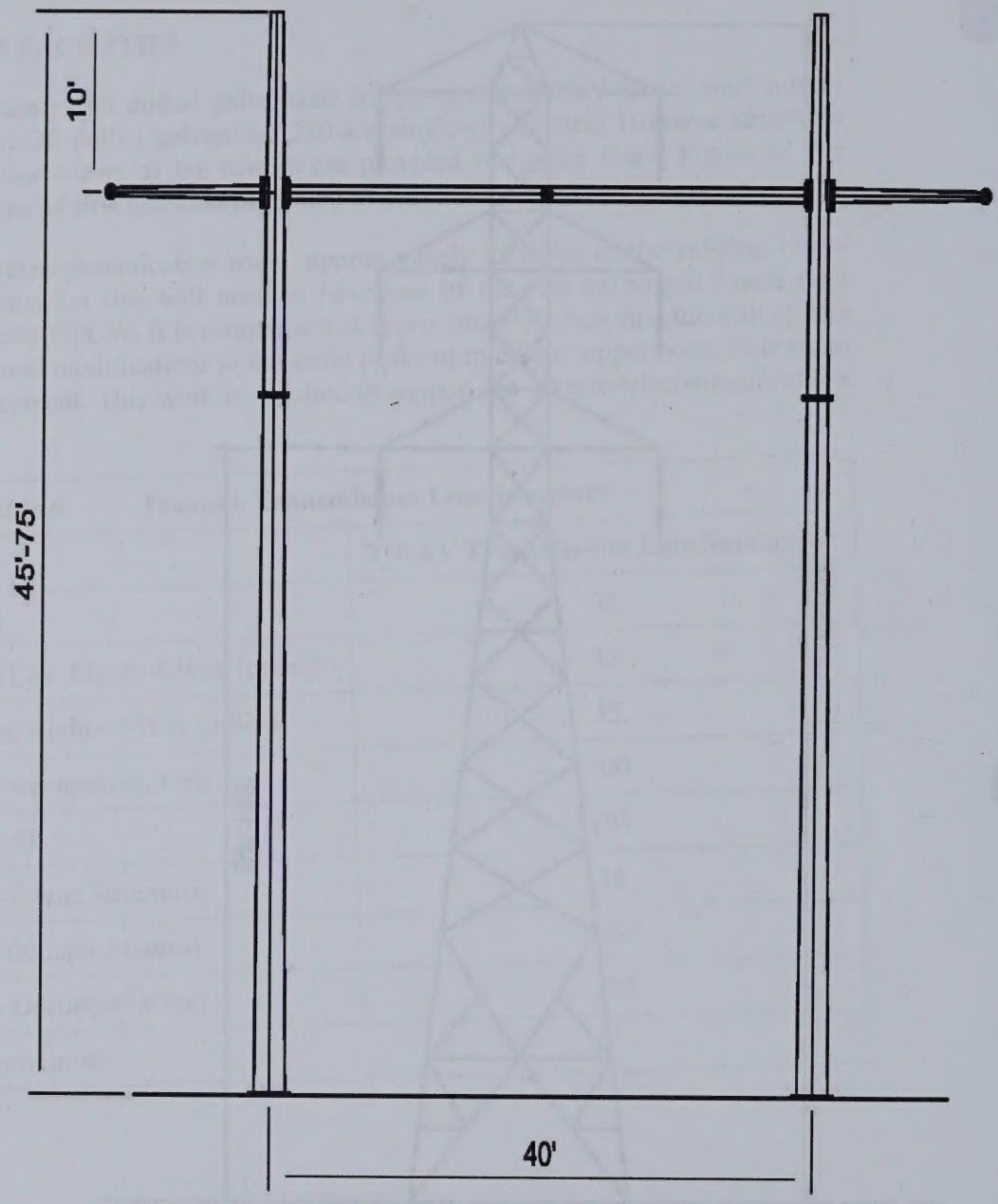

Figure 5 Typical 220-kV Single-circuit H-frame

2.1.1 Type of Structures

220-kV Transmission Line

The 220-kV transmission line will have two circuits of conductors. Each circuit is composed of three phases, with each phase consisting of two bundled 1,590-kilo circular mils (kcmil) conductors. The 1,590 kcmil conductors are made of aluminum strands with internal steel

reinforcement; conductors will have a non-specular finish. Each 1,590 kcmil conductor is approximately 1.5 inches in diameter.

The double-circuit LSTs will range in height from 110 to 160 feet. The single-circuit steel H-Frame structures will range in height from 45 to 75 feet. Most of the structure sites will require minor to substantial grading and new or re-developed access and spur roads. Each four-legged LST will typically be built on four drilled poured-in-place concrete footings. Each steel H-Frame structure will typically be built on two drilled poured-in-place concrete footings. The dimensions and types of each footing are dependent on variables such as topography, structure height, span lengths, and soil properties. At some tower locations located in the McCullough Pass area, the tower foundations may be installed using rock anchor or Micropile-type foundations. For these types of foundations, construction will have to be supported by helicopters. On average, a typical footing will have an above-ground projection of approximately 1 to 4 feet. The tangent and small angle 220-kV suspension hardware assembly will contain the necessary polymer insulators and required hardware for each structure. On dead-end structures, the assembly will contain the necessary polymer insulators and all necessary hardware. The OPGW will be located on the peaks of the transmission structures and are approximately 0.7 inch in diameter.

In order to maintain ground clearance and other utility conductor clearances when line crossings are necessary, shield wire on the 220-kV Eldorado-Ivanpah circuits may be placed underground in conduit. Existing 115-kV structures on the 35-mile Eldorado-Ivanpah portion of the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line will be removed. The foundations of these 115-kV tower structures will be removed 2 feet below ground grade and then back filled. Between Milepost 28 and Milepost 29, the new 100-foot right-of-way crosses from Clark County, Nevada, into San Bernardino County, California (see Figure 2). All portions of the transmission line located within the State of California are designed to meet at minimum General Order (GO) 95 standards. All portions of the transmission line located within the State of Nevada are designed to meet at minimum National Electric Safety Code standards.

115-kV Subtransmission Line

An approximately 600- to 800-foot-long new section of looped 115-kV line, consisting of 653.9 Aluminum Conductor Steel Reinforced (ACSR) and associated extra high strength (EHS) steel shield wire, will be strung from a connection point (Milepost 35) on the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line to a new rack position at the Ivanpah Substation (Figure 6). The new line section will create the SCE Cool Water-Baker-Dunn Siding-Mountain Pass-Ivanpah 115-kV transmission line, and will consist of 653.9 ACSR, one conductor per phase, three phases per circuit. From the connection point (Milepost 34) south for approximately one mile, seven existing H-Frame lattice structures will be removed and replaced with one tubular steel pole (TSP) (Figure 8) and six light-weight steel (LWS) H-Frames (Figure 7). In addition, seven new LWS H-Frames will have to be interset at midspan of these structures to meet current requirements. Existing 4/0 ACSR will be transferred and new structures will include EHS steel shield wires. Structure heights are approximately 45 to 75 feet above ground, with a span length of 350 to 800 feet, depending on topography. An estimated 500 feet of new spur roads will be required.

115-kV Subtransmission Line Removal

Initial work activities will consist of removing approximately 250 existing structures of various construction designs, as presented below. Removal will include line conductor and bisector anchors, as well as concrete caps. Where the 115-kV LST structures are located, the structure footings, concrete caps, and anchors will be cut/removed a minimum of 2 feet below ground level. Where LST are located on non-alluvial soils, structure footings, concrete caps, and anchors will be cut/removed 1 foot to 2 feet below ground level. The 250 existing structures include:

- 150 lattice H-Frame suspension/dead-end;
- One lattice H-Frame concrete footings;
- Two lattice H-Frame with storm guys;
- Four lattice H-Frame concrete footings and storm guys;
- 19 lattice H-Frame with four storm guys;
- 26 lattice H-Frame concrete footings with four storm guys;
- Five lattice H-Frame with six storm guys;
- One lattice H-Frame concrete footings with six storm guys;
- 13 four-legged lattice structure;
- 23 wood Pole H-Frame set in corrugated metal pipe (CMP);
- Five 3-pole wood structures set in CMP; and
- One single pole berry.

33-kV Distribution Line

A 33-kV distribution line will be installed to provide reliable lighting and power service to the new Ivanpah Substation. This component will consist of a new 33-kV riser pole, an overhead switch, approximately 400 feet of new underground conduit and cable, and padmount station light and power transformers within Ivanpah Substation. Approximately two remote control switches and one mile of additional new underground and overhead 33-kV circuitry will be installed adjacent to Densmore Drive at the California state line, near Primm, Nevada. One remote control switch will be installed south of the Ivanpah Substation and the second will be installed next to the Primm Valley Golf Club's Desert Course.

Adjacent to the new Ivanpah Substation, near the southwest corner, a new distribution pole will likely need to be interset in line with the existing 33-kV pole line and approximately two existing wood distribution poles will likely need to be replaced (and possibly relocated) in order to provide clearance over the newly created berm while maintaining clearance from the proposed 115-kV crossing.

At a location on Coloseum Road, approximately two wood distribution poles will either need to be replaced with taller poles or have pole-top-extensions added, and another pole added in order to create additional clearance over the road.

In addition, approximately 4,300 feet of a new 33-kV overhead line will be installed between the town of Nipton and the new microwave site proposed to be located northeast of Nipton. A transformer will be installed on this overhead line connecting to the microwave site using an underground duct. The line will be installed along the side of an existing unnamed dirt road. SCE will not be maintaining the dirt road. Construction vehicles will remain on the dirt road through the duration of the construction.

A new distribution pole is also required to be set outside of Mountain Pass Substation in order to provide clearance for the new proposed SCE telecommunication cable.

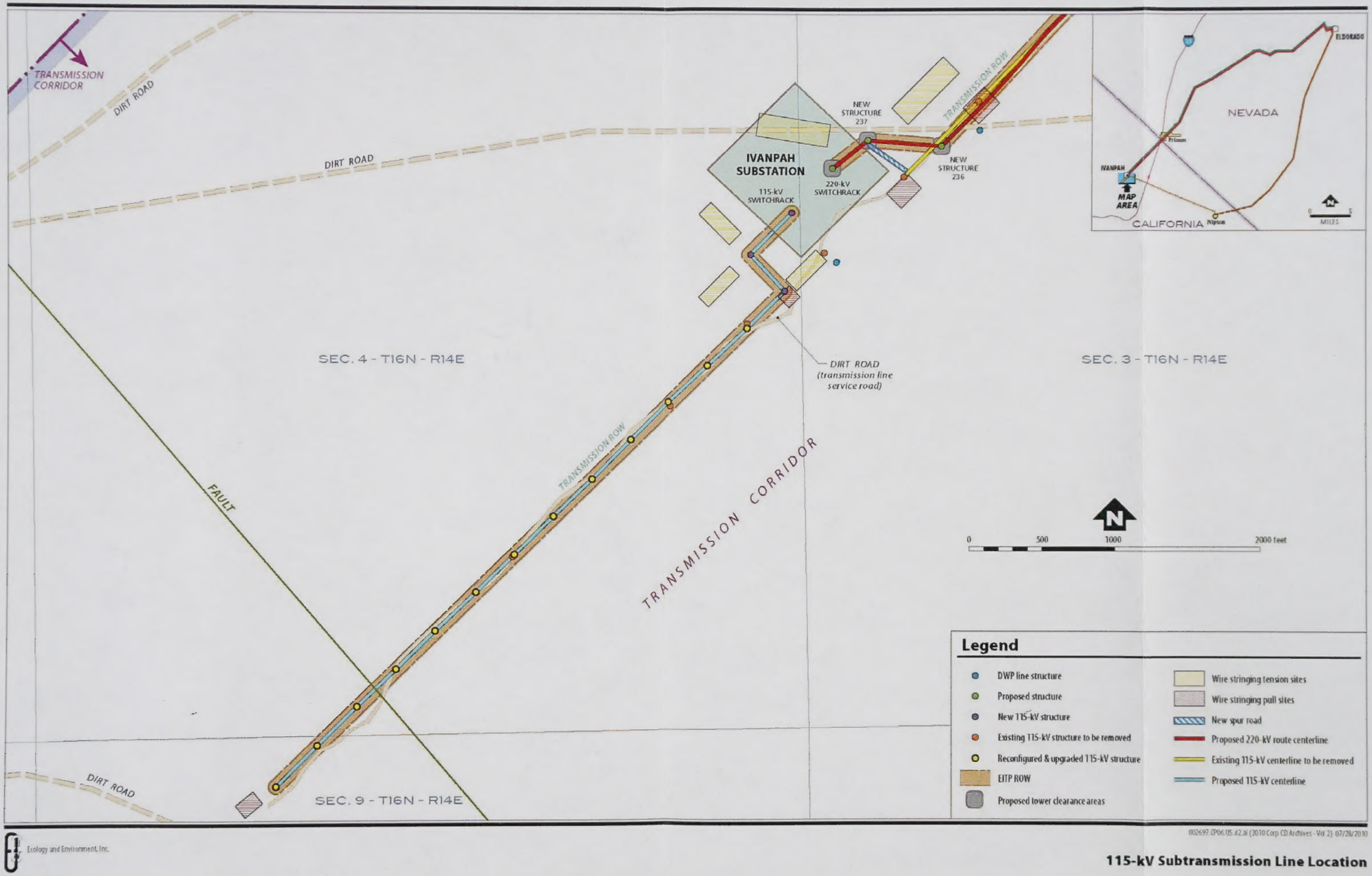

Figure 6 115-kV Subtransmission Line Location

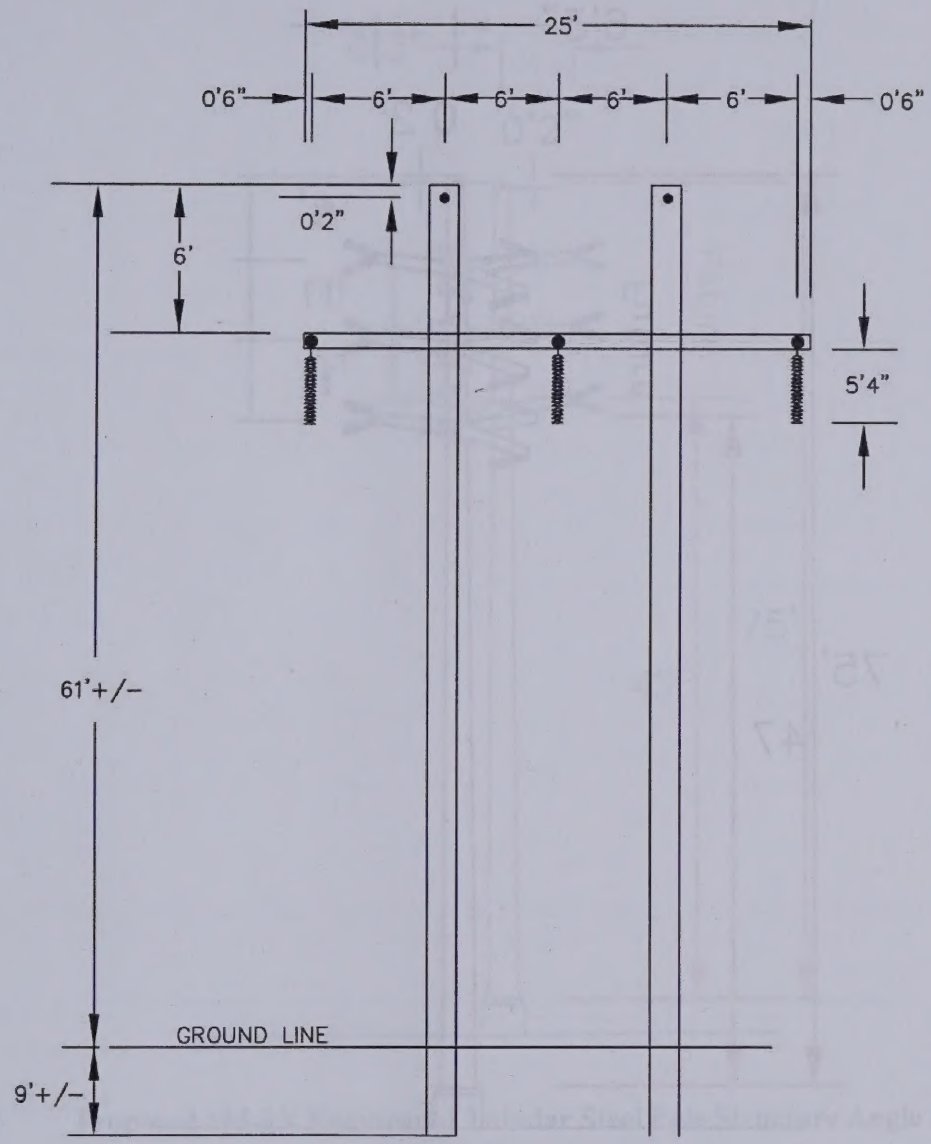

Figure 7 Proposed 115-kV Light Weight Steel H-Frame Structure Tangent Suspension or Dead End

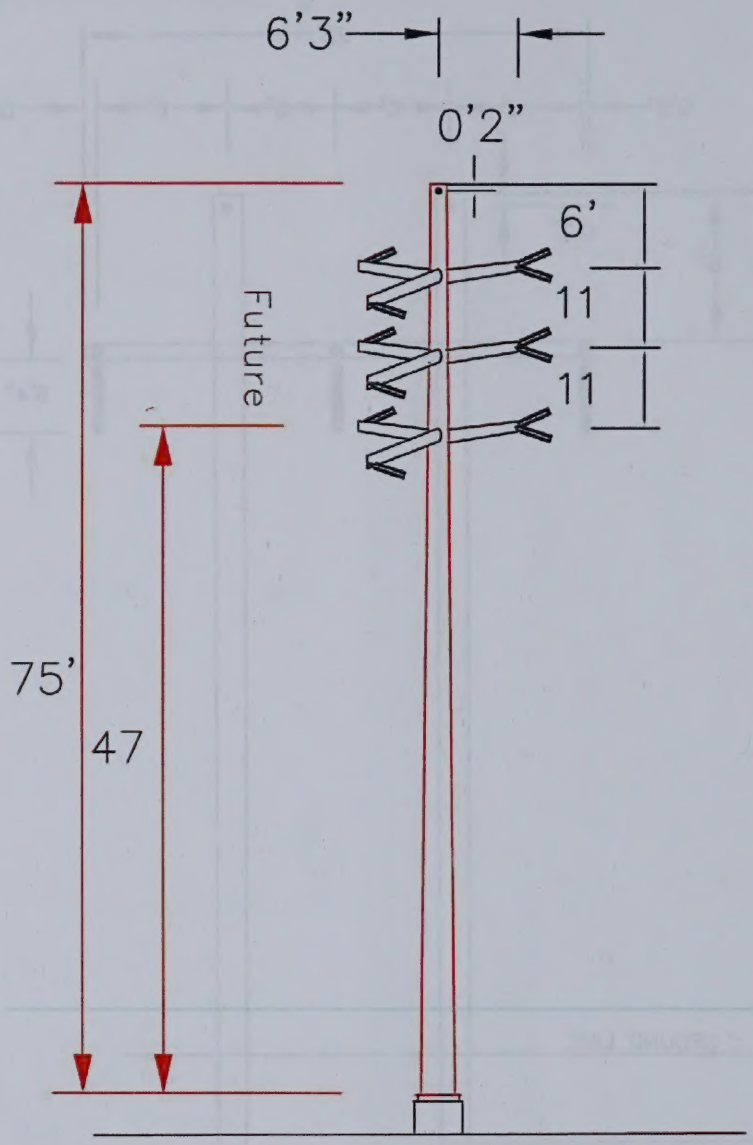

Figure 8 **Proposed 115-kV Engineered Tubular Steel Pole Structure Angle Dead End Inside Corner**

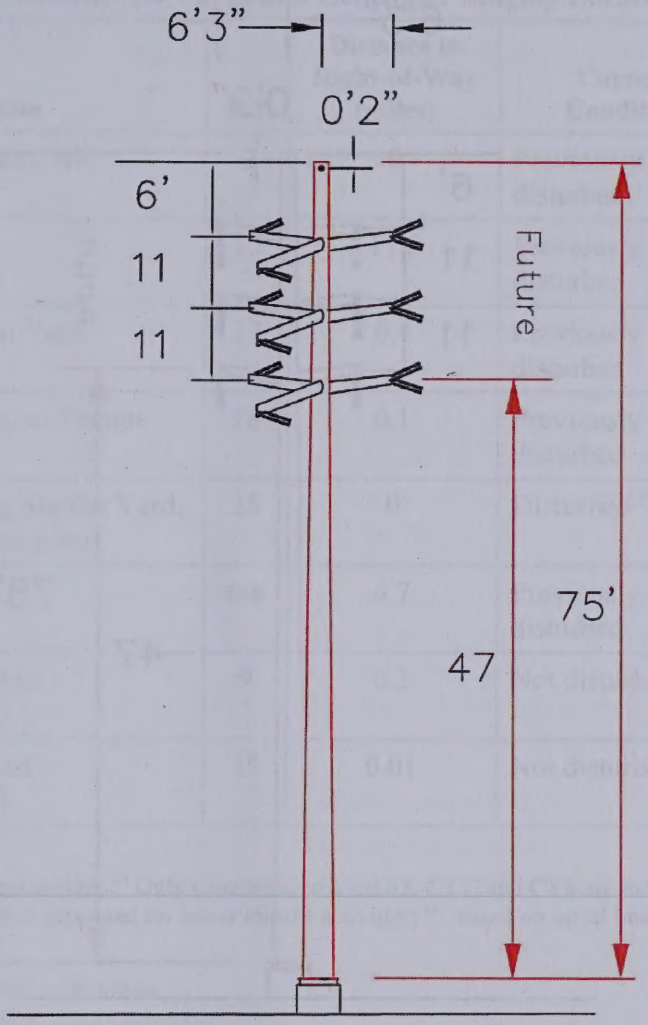

Figure 9 **Proposed 115-kV Engineered Tubular Steel Pole Structure Angle Dead End Outside Corner**

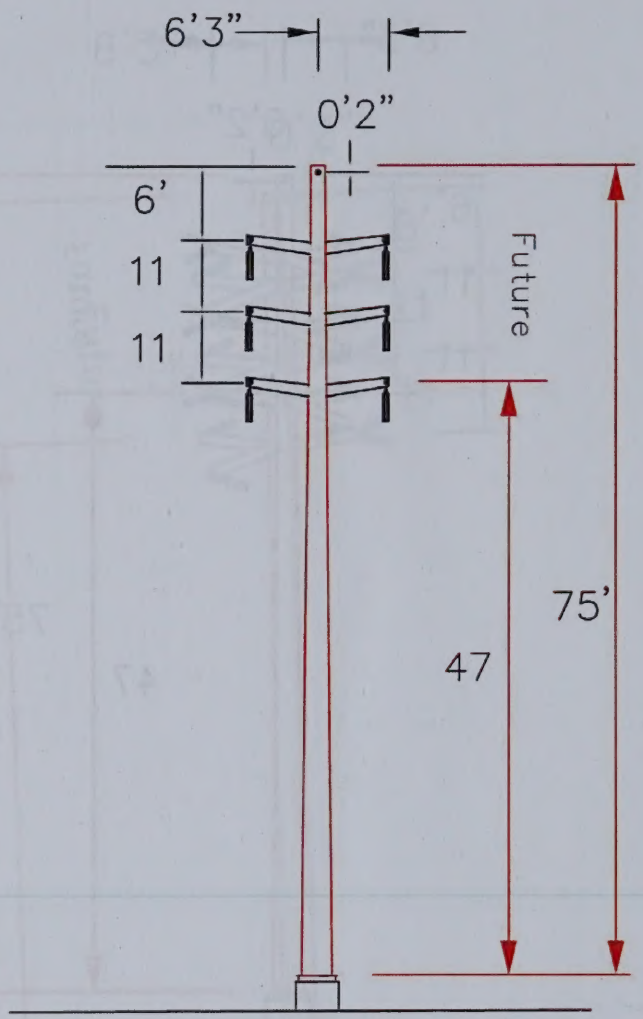

Figure 10 Proposed 115-kV Engineered Tubular Steel Pole Structure Tangent Suspension or Dead End

2.1.2 Survey and Tower Site Locations

Each survey location and tower site location will be identified on a revised project map currently in progress.

2.1.3 Staging Areas/Equipment Storage Areas

The locations of each construction and equipment storage yard are shown in Table 7. SCE is anticipating that helicopters will be able to take off and land at all construction yards to move materials and crew members to the multiple work sites along the project right-of-way.

Table 7 Construction Yards and Helicopter Staging Locations					
No.	Location	MP	Distance to Right-of-Way (miles)	Current Condition	Area (acres)[1]
CY 1	Eldorado Substation, NV	0	0	Previously disturbed	10.0
CY 2	Jean, NV	15	11.5	Previously disturbed	14.0
CY 3	Generating Station Yard (Bighorn), NV	27	0.4	Previously disturbed	14.0
CY 4	Primm Valley Casino Vacant Lot, NV	28	0.1	Previously disturbed	25.0
CY 5	ISEGS Generating Station Yard, CA (Ivanpah Substation)	35	0	Disturbed[2]	10+
CY 6	Nipton, CA [3]	n/a	4.7	Previously disturbed	10.0
CY 7 (HL 1)	McCullough (East of McCullough Pass)	9	0.2	Not disturbed [4]	5.0
CY 8 (HL 2)	Crossroads (West of McCullough Pass)	15	0.01	Not disturbed [4]	5.7

Notes:

[1] Approximate areas based on current design; [2] Only Construction Yard #5, CY7, and CY8 are located on public (BLM) land; [3] Construction Yard #6 is proposed for tower retrofit activities; [4] Based on aerial imagery

Key:

CY = Construction Yard MP = Mile Post

HL = Helicopter Landing Site N/A = not applicable

3.0 ADDITIONAL COMPONENTS

3.1 ACCESS (PERMANENT AND TEMPORARY)

Construction of a new transmission line requires access to each structure site for construction crews, materials, and equipment (see Appendix A). Existing access roads will be used to the extent feasible for construction of the project; where needed, these roads will be improved. Approximately 1.2 miles of new access roads and 1.7 miles of new spur roads will be required for the project route to provide access to structure sites in some locations. These roads will disturb approximately 4.9 acres of land. Access roads are shown on Figure 11. All roads used for project construction will be retained for use by maintenance crews and repair vehicles to access each structure for inspection and maintenance activities during the operation phase of the project,

and could be stabilized with waterbars or other erosion control devices as identified in the project Stormwater Pollution Prevention Plan (SWPPP). Existing, new, and re-developed spur roads for construction and operation of the project are shown in Appendix A.

Access and spur roads are typically a minimum of 14 feet wide with a 2-foot berm on either side, but may be wider depending on final engineering requirements and field conditions. The main access road will follow the transmission right-of-way, with spur roads branching off to each structure location. Spur roads will be an average of 200 feet long and will usually have turnaround areas near the structure locations. Longer or slightly wider spur roads may be needed in some locations. Existing access roads will be maintained to permit their being used by construction equipment. Some road modifications may be required to allow use of heavy equipment.

At the end of project construction, all roads utilized for construction purposes will be left in a condition equal to or better than the condition that existed prior to the start of construction. Loose rock and slide material will be removed, as possible, from existing roads and used to construct road dikes, fill washouts, or flatten fill slopes. All washouts, ruts, and irregularities will be filled or obliterated. Access and spur road gradients will be leveled so that any sustained grade does not exceed 12 percent. Grades of approximately 14 percent will be permitted when such grades do not exceed 40 feet in length and are located more than 50 feet from any other excessive grade or any curve. All curves will have a radius of curvature no less than 50 feet, measured at the centerline of the usable road surface. All dead-end spur roads more than 500 feet long will include a Y-type or circle-type turnaround.

Eldorado-Ivanpah Transmission Project

Figure 11
Access Roads

SCE Corp Environment, Health & Safety
Eldorado-Ivanpah Transmission Project
Projection: NAD 83 UTM Zone 11N
Date: 10/4/2011

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Path: Z:\Projects\EITP\ArcGIS\Final\access roads.mxd

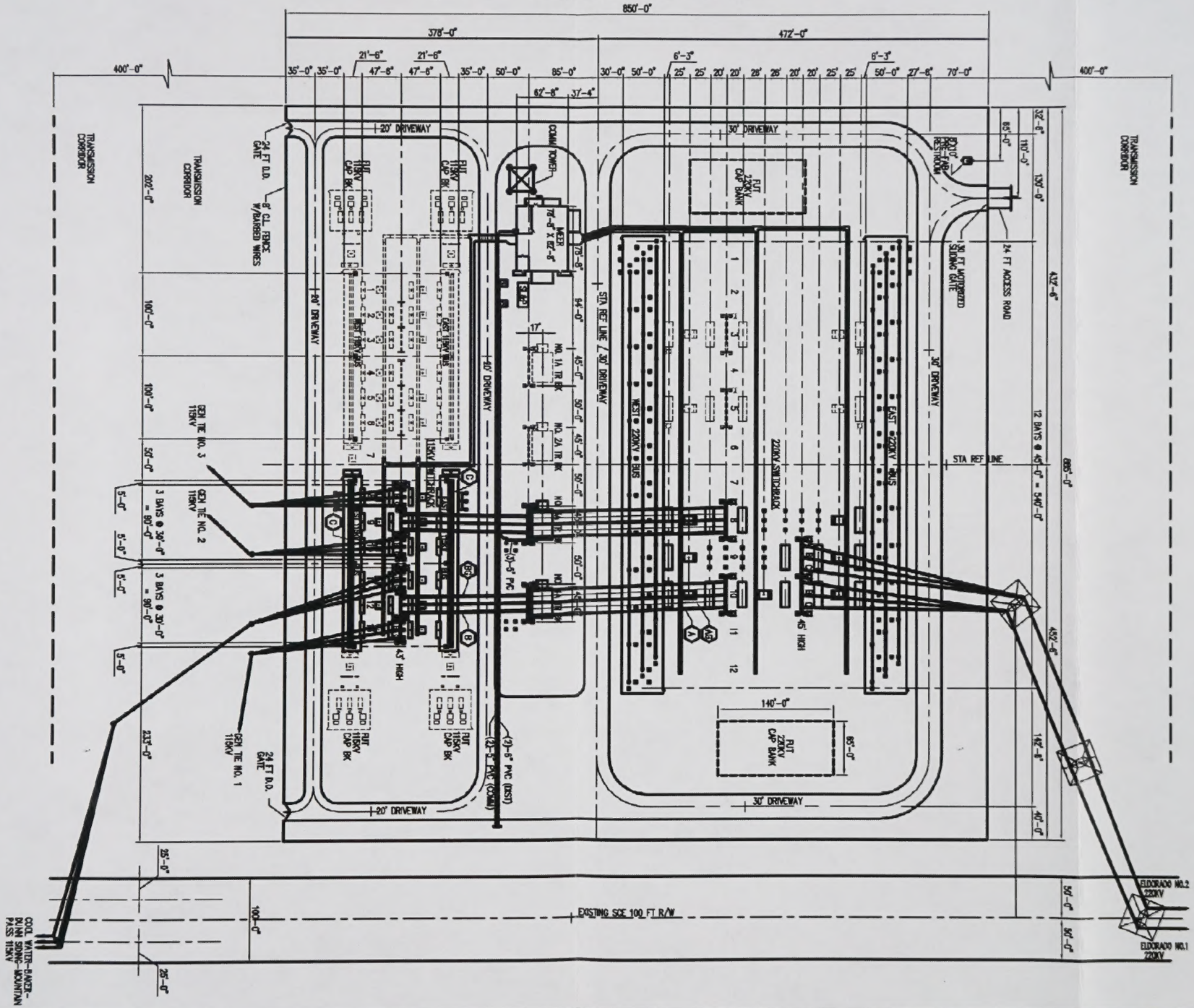
3.2 IVANPAH 220/115-KV SUBSTATION

The 220/115-kV Ivanpah Substation (Figure 12) will be constructed to accommodate an ultimate 1,120 megavolt ampere (MVA) facility to be owned, operated, and maintained by SCE. This ultimate configuration requires a fenced area of 885 feet by 850 feet, with a 10-foot-wide perimeter buffer outside the fence. Areas devoted to cut and fill side slopes to accommodate grading will total approximately 19 acres of disturbed land. Two areas measuring approximately 1,015 feet by 400 feet and containing approximately 9 acres each will be located to the westerly and easterly ends of the substation site, and will provide access for the 220-kV and 115-kV lines into the substation. Protective drainage improvements and substation access for all transmission lines will flank the fenced area on the east and west. Ground disturbance within these areas will be limited to that needed for construction and access to the structures/poles located within the areas. The total substation site area will be approximately 1,650 feet by 1,015 feet, consisting of approximately 38.5 acres. The grading of the Ivanpah Substation will be completed under the application of the Ivanpah Solar Electric Generating System (ISEGS), with the California Energy Commission (CEC) for their solar power generation facility. This component will include the 885-foot by 850-foot substation site, the 10-foot perimeter buffer, and the area containing cut and fill slopes resulting from grading. In addition, a 24-foot-wide paved road will be included to provide vehicular access to the following: the substation; fencing; a portion of the 115-kV switchrack; the mechanical electrical equipment room (MEER), approximately 74 feet by 62 feet; and an approximately 180-foot-tall microwave tower. The ultimate configuration will include four 280-MVA 230/115-kV transformer banks, twelve 220-kV bays, and nine 220-kV lines; fifteen 115-kV bays and eight 115-kV lines; and four 115-kV 46.8-MVA reactive capacitor banks. The initial configuration of the substation will include a total of two 280-MVA 230/115-kV transformer banks, two 220-kV and four 115-kV lines, and associated switchracks. A 180-foot tall microwave tower will be installed as part of the project.

Generation Tie Line #1: SCE will design, engineer, and construct a 115-kV generation tie line approximately 500 feet from ISEGS's underground to overhead structure to the Ivanpah Substation's 115-kV rack. From ISEGS's structure, located outside of the southeast corner of Ivanpah Substation, SCE will install one engineered TSP, approximately 70 to 75 feet in height, with a bolted concrete footing approximately 5 feet in diameter and 30 feet in depth. The TSP will be located approximately 285 feet northwest of the ISEGS's structure and 30 feet south of the Ivanpah Substation fence line. The TSP will consist of one single-circuit 115-kV line, consisting of three phases, and associated line hardware consistent with transmission line construction.

Generation Tie Line #2 & #3: SCE will design, engineer, and construct the #2 and #3 115-kV generation tie lines, approximately 1,650 feet from ISEG's overhead structure to the Ivanpah Substation's 115-kV rack. From the ISEGS's structure, located outside of the southwest corner of Ivanpah Substation, SCE will install five engineered TSPs approximately 70 to 75 feet in height, with a bolted concrete footing approximately 5 feet in diameter and 30 feet in depth. TSPs will consist of a double-circuit 115-kV line, consisting of three phases each, and associated line hardware consistent with transmission line construction.

Figure 12 Ivanpah Substation Plot Plan



3.3 ELDORADO 500/220/115-KV SUBSTATION

The existing Eldorado Substation is located on BLM land approximately 14 miles southwest of Boulder City, in the State of Nevada. The project requires two 220-kV line positions to terminate the new Ivanpah No.1 and No.2 bundled double-circuit 220-kV transmission lines. The installation of the two additional positions requires that the existing 220-kV switchyard be extended within the existing substation fence. No surface grading is required for this extension. An existing 230/115-kV transformer bank will be removed.

3.4 TELECOMMUNICATION SYSTEM

The project will require construction of two fully diverse and redundant communication paths to support both a special protection system that will trip the project relays under specific outage contingencies, as well as for the operating and monitoring of the substation and transmission line equipment. The paths will connect the Eldorado Substation to the Ivanpah Substation. New telecommunication infrastructure will be installed to provide protective relay circuit, supervisory control and data acquisition circuit, data, and telephone services to the Ivanpah Substation. The following sections describe the new telecommunication infrastructure.

3.4.1 Telecommunication Paths

The communication link between the Eldorado Substation and the Ivanpah Substation consists of two diverse telecommunication paths, referred to as Path 1 and Path 2. Both paths are shown on Figure 2 and are described below. Note that the new transmission line route will also carry telecommunication cable.

Path 1 – The first telecommunication path from the Eldorado Substation to the Ivanpah Substation uses new OPGW along the Eldorado-Ivanpah 220-kV transmission line. The approximate length of the path is 35 miles. At several crossing locations the fiber optic cable will have to be installed underground because of the limited height of the existing utilities facilities. Due to some of the long underground fiber cable runs it will be necessary to install underground manholes between some of these crossings.

Path 2 – The second telecommunication path from the Eldorado Substation to the Ivanpah Substation consists of the following three sections (as shown on Figure 2):

Path 2, Section 1 extends from the Eldorado Substation to a 500-kV tower (M152-T2) of the existing SCE Eldorado-Lugo 500-kV transmission line, near the intersection of Highway 164 and the 500-kV right-of-way. Approximately 25 miles of the existing SCE Eldorado-Lugo 500-kV transmission line will have one of the two existing 0.5-inch steel ground wires replaced with OPGW. Approximately seven of the existing structures along this route will require some form of structural modifications, either at the static peaks, mid to upper body, or both, to accommodate the replacement of the ground wire with OPGW. The loading capacity of modified structures with the new OPGW will conform to GO 95 loading criteria. The exact number of structures and the specific type of modifications will be determined once final engineering has been completed.

Path 2, Section 2 extends in an underground duct from the SCE Eldorado-Lugo 500-kV transmission line tower (M152-T2) to the town of Nipton. Tower M152-T2 is located approximately 4.8 miles east of the town of Nipton, on the north side of Highway 164. The Path 2, Section 2 route will parallel Nipton Road on the north side in an underground duct that will be installed along a new roadside right-of-way.

Path 2, Section 3A is the route from the town of Nipton to the Ivanpah Substation, via a microwave transmission system over 12 miles of microwave path. A communication site northeast of the town of Nipton will be built to maintain an approximately 180-foot-tall microwave tower. The communication site will be approximately 100 feet by 100 feet. The Path 2, Section 3A fiber cable will extend from the town of Nipton in an underground duct that will terminate at the communication site. An overhead distribution line will be extended from the town of Nipton to the communication site for power connection (see Section 2.1.1). At the Ivanpah Substation, a microwave tower approximately 180 feet tall will be built to link to the Nipton communication site via the air microwave path.

The telecommunication path from Ivanpah substation to local carrier facility interface at Mountain Pass area consists of approximately 8 miles of fiber optic cable to be installed overhead on existing distribution line poles. An approximately 200-foot section of the cable entering the substation will be installed underground; an approximately 150-foot section of the cable entering the telecom carrier interface point location at Mountain Pass will be placed underground. This fiber route consists of two segments. The first segment is from Ivanpah Substation going southwest toward the Mountain Pass Substation utilizing existing 33-kV distribution line poles built along the transmission line corridor. The second segment is from the Mountain Pass Substation going southeast to an existing telecommunication carrier microwave site utilizing existing 12/33-kV distribution line poles. At the microwave site, a leased space in an existing telecom facility will be used for installation of telecom interface equipment, housing of DC battery backup system and for terminating the fiber optic cable.

4.0 GOVERNMENT AGENCIES INVOLVED

Table 8 provides a preliminary list of the agencies involved, as well as a list of the required permits or approvals and possible agency actions.

Table 8 Permits or Other Actions Required Prior to Construction of the Project

ITEM NUMBER	DESCRIPTION OF PERMIT	AGENCY/CITY /COUNTY	COMMENTS	DATE SUBMITTED TO AGENCY	DATE ISSUED / EXPECTED	DATE ACTUALLY ISSUED	REQUIRED FOR EARLY INTERCONNECTION
FEDERAL PERMITS							
1	Record of Decision	BLM	Construction and operations within public lands administered by the BLM	June 2009	May 2011	May 19, 2011	Yes
2	Right-of-Way Grant (115 Removal and 230 Installation)	BLM	Needed for Nevada Permit to Construct		May 2011	May 2011	Yes
3	Right-of-Way Grant (500-kV Telecom Route)	BLM	Needed for Nevada Permit to Construct (outage scheduled for March 1, 2012 to April 15, 2012)		October 31, 2011		Yes
4	Notice to Proceed	BLM	Needed for Nevada Permit to Construct		60-90 Days After Record of Decision Issued (June 21, 2011)		Yes
5	Paleo Collection Federal Permit	BLM, NV (Las Vegas Field Office)	New Application Process	October 2011	September 2011		Yes

Table 8 Permits or Other Actions Required Prior to Construction of the Project

ITEM NUMBER	DESCRIPTION OF PERMIT	AGENCY/CITY /COUNTY	COMMENTS	DATE SUBMITTED TO AGENCY	DATE ISSUED / EXPECTED	DATE ACTUALLY ISSUED	REQUIRED FOR EARLY INTERCONNECTION
6	Nation Wide Permit (404)	U.S. Army Corps of Engineers (USACE)	Discharge of fill, in waters of the U.S. Clean Water Act, Section 404	May 25, 2011	September 9, 2011	June 8, 2011	Yes
7	Section 7, Biological Opinion	U.S. Fish and Wildlife Service (USFWS)	Listed Threatened and Endangered Species		April 29, 2011	April 29, 2011	Yes
8	7460(1) Permit and Notice Proposed Construction or Alteration	Federal Aviation Administration (FAA)	Airport and Airline Safety		October 31, 2011		Yes
9	7460(1) Permit and Notice Proposed Construction or Alteration	FAA	Airport and Airline Safety, 3 Towers Determined Hazards	August 29, 2011	December 30, 2011		Maybe
CALIFORNIA STATE PERMITS							
10	Certificate of Public Convenience and Necessity	CPUC	Oversees Transmission, substation, generation projects over 50-kV and above		December 16, 2010	December 16, 2010	Yes
11	Incidental Take Permit	California Department of Fish and Game (CDFG)	Section 2081 of California Endangered Species Act	May 25, 2011	September 2011	September 30, 2011	Yes

Table 8 Permits or Other Actions Required Prior to Construction of the Project

ITEM NUMBER	DESCRIPTION OF PERMIT	AGENCY/CITY /COUNTY	COMMENTS	DATE SUBMITTED TO AGENCY	DATE ISSUED / EXPECTED	DATE ACTUALLY ISSUED	REQUIRED FOR EARLY INTERCONNECTION
12	Streambed Alteration Agreement 1602 Permit	CDFG		May 25, 2011	September 30, 2011		Yes
13	Construction General Permit	Lahontan Regional Water Quality Control Board (RWQCB)			October 31, 2011		Yes
14	401 Certification	Lahontan RWQCB		May 25, 2011	October 31, 2011		Yes
15	Road /Highway Encroachment / Crossing Permit	California Department of Transportation (Caltrans) District 7	For Interstate-15 (I-15), Takedown				N/A
16	Road /Highway Encroachment / Crossing Permit	Caltrans District 7	For I-15, Installation				N/A
17	Environmental Protection Agency Identification Number	Department of Toxic Substances Control	California Health and Safety code, Title 22, California Code of Regulations 662.62.12		March 2, 2012		Yes

Table 8 Permits or Other Actions Required Prior to Construction of the Project

ITEM NUMBER	DESCRIPTION OF PERMIT	AGENCY/CITY /COUNTY	COMMENTS	DATE SUBMITTED TO AGENCY	DATE ISSUED / EXPECTED	DATE ACTUALLY ISSUED	REQUIRED FOR EARLY INTERCONNECTION
CALIFORNIA LOCAL PERMITS							
18	Road / Highway Encroachment / Crossing Permit / Flood Control / Drainage Channel / Lane Closure	San Bernardino County	County roads and highways, flood control, drainage channels		August 1, 2011	September 1, 2011	Yes
19	Grading Permit	San Bernardino County	County roads and highways, flood control, drainage channels		February 15, 2012		Yes
NEVADA STATE PERMITS							
20	Utility Environmental Protection Act - Permit to Construct	Public Utilities Commission-Nevada	12 Permits Listed in Amended Application		November 1, 2011		Yes
21	Right-of-Way Encroachment Permit	Nevada Department of Transportation	Telecom Encroachment Permit	July 1, 2011	October 24, 2011		Yes
22	Traffic Control Plan Approval	Nevada Department of Transportation	The Nevada Department of Transportation Right-of-Way Encroachment Permit requires the	July 1, 2011	September 1, 2011		Yes

Table 8 Permits or Other Actions Required Prior to Construction of the Project

ITEM NUMBER	DESCRIPTION OF PERMIT	AGENCY/CITY /COUNTY	COMMENTS	DATE SUBMITTED TO AGENCY	DATE ISSUED / EXPECTED	DATE ACTUALLY ISSUED	REQUIRED FOR EARLY INTERCONNECTION
			contractor to submit a Traffic Control Plan.				
23	Construction General Permit	Nevada Division of Water Resources	(Same as the SWPPP)	September 1, 2011	September 1, 2011	September 13, 2011	Yes
24	401 Certification	Nevada Division of Water Resources		May 25, 2011	July 8, 2011	July 8, 2011	Yes
25	Temporary Permit for Working in Waterways	Nevada Bureau of Water Pollution Control (submitted September 2, 2011 without team review by Richard Haywood, contingent biologist)	Construction of access roads and utility facilities	September 2, 2011	September 30, 2011	September 26, 2011 Effective October 1, 2011	Yes
26	Hazardous Material Storage	Nevada State Fire Marshall	Update Existing for Eldorado Substation		November 3, 2011		Yes

Table 8 Permits or Other Actions Required Prior to Construction of the Project

ITEM NUMBER	DESCRIPTION OF PERMIT	AGENCY/CITY /COUNTY	COMMENTS	DATE SUBMITTED TO AGENCY	DATE ISSUED / EXPECTED	DATE ACTUALLY ISSUED	REQUIRED FOR EARLY INTERCONNECTION
	Permit						
NEVADA LOCAL PERMITS							
27A	Dust Control Permit - 230 Line Installation	Clark County Department of Air Quality and Environmental Management	Construction Fugitive Dust - PM10 Permit # 40367	A.L. Wilson Submitted on August 23, 2011	September 1, 2011	September 13, 2011	Yes
27B	Dust Control Permit - Staging Areas	Clark County Department of Air Quality and Environmental Management	Construction Fugitive Dust - PM10 Permit #40364	A.L. Wilson Submitted on August 23, 2011	September 1, 2011	September 12, 2011	Yes
27C	Dust Control Permit - Access Roads	Clark County Department of Air Quality and Environmental Management	Construction Fugitive Dust - PM10 - Permit # 40363	A.L. Wilson Submitted on August 23, 2011	September 1, 2011	September 12, 2011	Yes
28	Conformity Finding	Clark County Regional Planning Coalition			November 17, 2010	November 17, 2010	Maybe
29	Special Use Permit	Clark County Board of Commissioners	Construction and Operation	November 18, 2010	January 4, 2011	January 4, 2011	Yes

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5.0 CONSTRUCTION OF THE FACILITIES

This section describes methods typically used for constructing and installing transmission lines, substation modifications, and other features of the project.

The primary construction activities and areas of potential impact will be confined to access roads, spur roads, structure locations, and pull sites. Temporary construction activities will also take place at construction yards and batch plants (see Table 7 for locations).

5.1 TRANSMISSION LINE SURVEYING

Preconstruction survey work locating the centerline, structure center hubs, right-of-way boundaries, and structure access roads has been conducted. Surveys have also been conducted for environmental resources.

Under this siting procedure, a multidisciplinary SCE crew has visited each tower site, following the completion of preliminary engineering and prior to the commencement of detailed, final engineering of the structures. Each tower site and associated stub road has been reviewed by the crew to assess the suitability of the site. If no environmental sensitivities were identified and there were no other issues affecting construction, maintenance, or real estate, the site was marked as approved and the crew moved to the next tower site and stub road. Final engineering will proceed on that tower at the approved location.

Where environmental sensitivity was identified (e.g., desert tortoise burrow was found nearby, a tower leg located in a dry stream channel, etc.), the crew moved the structure site, if possible, to avoid the sensitivity. In general, towers will not be moved side to side, but only in-line. In most cases, the crew was able to move a tower site away from sensitivities to a new site. Typically, this was accomplished with a move of 50 feet or less. The recommended new tower site was then inspected by the crew. If no environmental sensitivities and no construction, maintenance, or real estate issues were identified, preliminary engineering for this new site was checked and the new tower site and associated stub road route was approved by the crew. Once structure sites were approved, final detailed engineering was to proceed. During detailed engineering, no further tower site adjustments would occur without consultation with the interdisciplinary crew.

Approximately 24 to 48 hours prior to construction equipment being moved on site, a crew of biologists will inspect each site to detect and remove desert tortoises. If a tortoise burrow is detected, it will be cleared of tortoises that could be inside, and then closed to prevent additional tortoises from entering the burrow. This will be consistent with USFWS Biological Opinion and CDFG incidental take authorizations.

In some instances and at some extreme tower locations, especially likely in the McCullough Pass area, the tower foundations for LSTs and steel H-Frame structures may be installed using different methods.

5.2 FLAGGING AND STAKING

Flagging and staking will provide the authorized officer, environmental compliance officers, construction managers, inspectors, equipment operators and work crews with on-the-ground reference markers of the approved work areas. No driving off existing roadways will occur during flagging activities. The limits of construction activities will normally be predetermined (e.g., with activity restricted to and confined within those limits). Colored plastic ribbon, or paint, will be used to identify a wide variety of activities in the field. Colors of plastic "flagging" and other markings will indicate various areas within and outside of the right-of-way as indicated in Table 9.

Table 9 Flagging Plan

Location	Flag Description
Right-of-way limits	Yellow and White Striped Flag*
Horizontal and vertical control Section corner Property lines	Glo-pink flags
Avoidance area (such as environmentally sensitive areas, archaeological sites)	Yellow and black striped flags
Point of intersection	Green and white striped flags
Structure hubs	Rebar and red and black striped flag
Reference stakes (50 feet and 75 feet offset)	Black and white striped flag
Access roads (edges)	Orange and white striped flag
Trees to be removed	Spray paint

*The above flagging will be at required locations to maintain visibility in a line of site along right-of-way edge.

Flagging also will alert equipment operators to potential areas of avoidance, and help to delineate access roads and limits of the right-of-way. The following are the general stipulations that will apply.

The contractor shall place slope, culvert location, grade, and other construction control stakes as deemed necessary by the authorized officer to ensure construction in accordance with this POD. If stakes or flagging are disturbed, they shall be replaced as needed before proceeding with construction.

The contractor shall survey and clearly mark the centerline and exterior limits of the right-of-way with a stake and/or lath. The intervals may be varied at the time of staking at the discretion of the authorized officer. The top of the stakes and/or laths will be painted and laths flagged in a distinctive color (see Table 9). The survey station numbers will be marked on the boundary

stakes and/or laths at the entrance to and exit from public land. Signs will be posted on all open project access roads to designate the route as a project access. No construction vehicles will be allowed to use any roads that are not part of the transportation access plan for the project. The contractor will maintain all boundary stakes and/or laths in place until final cleanup and restoration are complete and approved by the authorized officer. The stakes and/or laths will then be removed at the direction of the authorized officer.

No marking paint or permanent discoloring agents will be applied to rocks or vegetation to indicate limits of survey or construction activity. Surface disturbance or construction within 300 feet of all perennial water resources will be limited and shall be clearly marked, as specified by the authorized officer. Any deviation from this requirement shall have prior written approval of the authorized officer.

The authorized officer and construction manager may assign additional flagging requirements as needed. All flagging and/or lath will be removed upon completion of construction.

5.3 ACCESS ROAD CONSTRUCTION

Transmission line roads are classified into two main groups: access roads and spur roads. Access roads run between tower sites and serve as a main transportation route along the transmission line right-of-way. Spur roads usually lead from the access roads and terminate at one or more structure sites.

Approximately 35 miles of existing main roads will need to be upgraded to support project construction and operations. In addition, more access roads will be required for construction and maintenance of the telecommunication facilities, as well as additional access roads for connecting the project facilities to support and logistics areas. Additionally, 1.2 miles of access roads and 1.7 miles of spur roads will be constructed to allow passage of construction vehicles to the construction sites. Upgrades and new construction might require vegetation clearing and grading based on site conditions. The new access and spur roads will be a minimum of 14 drivable feet wide with approximately 2 feet of berm on either side of the road. It is anticipated that most of the access and spur roads will be left in place to access the facilities for operations and maintenance and will be stabilized with waterbars, water dips, or other erosion control devices as required.

The existing access and spur roads might require reconstruction and maintenance prior to construction activities. Reconstruction works may include clearing, grading, and compacting the existing roads to remove potholes, ruts, and other surface irregularities to provide a smooth and dense surface capable of supporting heavy equipment. Specific locations for reconstruction works will depend on impacts of weather conditions over the existing roads and final project engineering design.

5.4 STRUCTURE SITE CLEARING, FOUNDATION EXCAVATION, AND FOUNDATION INSTALLATION

5.4.1 Dismantling and Removal of Existing 115-kV Transmission Facilities

The project will involve removing approximately 208 existing 115-kV LST H-Frames; 13 existing 115-kV LSTs; 23 wood pole H-Frames; six wood poles and associated hardware (cross arms, insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotter pins, insulator weights, and bond wires); and the transmission line conductor. The 115-kV line will stay in service from Mountain Pass Substation to the Cool Water Generating Station. The section of line between Mountain Pass and the Eldorado substations will be de-energized. The portion of the line from the Ivanpah Substation to the Eldorado Substation will be out of service, and the 115-kV line will be removed between Eldorado Substation and Ivanpah Substation prior to the start of construction of the 220-kV transmission line.

SCE proposes to remove the existing 115-kV structures and conductors in the following sequence:

- Road work – Existing access roads will be used to reach structures, but some rehabilitation and grading might be necessary before removal activities begin to establish temporary crane pads for structure removal.
- Wire-pulling locations – Wire-pulling sites may be located up to 18,000 feet along the existing utility corridor, and will include locations at dead-end structures and turning points. Many of the pulling/tensioning locations used for the removal of existing 115-kV lines will be used for installation of the new 220-kV transmission lines.
- Cable removal – A rope or 3/8-inch pulling cable will replace the old conductor as it is removed. The rope or cable will then be removed under controlled conditions to minimize ground disturbance. The old conductor wire will be wound onto "breakaway" reels as it is removed and will be transported to a construction yard to be prepared for recycling.
- Structure removal – For each type of structure, a truck crane or rough-terrain crane will be used to support the structure during removal. An approximate 50-foot by 50-foot crane pad may be required to allow the crane to be set up at a distance of approximately 60 feet from the structure centerline. Wood pole structures will be completely removed.
- Footing removal – The existing LST and H-Frame footings will be removed to a depth of approximately 2 feet. Holes will be filled with removed soil and compacted; the area will then be smoothed to match the surrounding grade.

The first portion of the work will require the removal of necessary structures, conductor, and line hardware to support the Early interconnect Phase. Removal of existing circuit would follow the same process as described earlier.

5.4.2 Site Preparation

Installation of the 220-kV transmission line will require construction of approximately 193 new LSTs and approximately 36 steel H-Frame structures. Each LST and H-Frame structure will be installed onto a flat, vegetation-free area or pad. SCE will grade and/or clear the site to create a vegetation-free surface for footing construction. Grading may be conducted so that water will run in the direction of the natural drainage. The graded area will be compacted and capable of supporting heavy vehicular traffic.

Ideally, structure laydown areas with sparse vegetation will not require vegetation clearing. SCE will apply alternative methods such as drive and crush, mowing, and trimming of the laydown areas instead of clearing vegetation. The structure locations themselves and the 25-foot clearance area around the structures will require clearing.

The LSTs and steel H-Frame structures will be assembled near the locations where they will be installed. Typically, they will be assembled in an approximately 200-foot by 200-foot construction area. Depending on the condition of the area, clearing and/or grading will be necessary to prepare it for construction.

To erect either the LSTs or the steel H-frame structures, a crane pad (a flat, vegetation-free area) may need to be established within the construction area. Crane pads, if required, may be located approximately 60 feet from the centerline of the structure.

In mountainous areas, special techniques may be required to provide access for construction, assembly, erection, and wire-stringing activities during the transmission line construction. These special techniques will be used to help ensure the safety of personnel during construction activities.

5.4.3 Foundation Installation

Each of the approximately 193 LSTs and 38 steel H-Frame structures for this project will require multiple drilled, poured-in-place concrete footings to form the structure foundation. The size and type of the foundation will depend on the type of structure, soils conditions, and topography. LST foundations will consist of four concrete footings, while H-Frames will have two concrete footings.

The foundation construction process will start with the drilling of boreholes for each footing. The boreholes will be drilled using truck or track-mounted drilling rigs. At some tower locations located in the McCullough Pass area, the tower foundations may be installed using rock anchor or Micropile-type foundations. For this type of foundation, the work will have to be supported by helicopters. LSTs typically require a borehole 3 to 5 feet in diameter and 20 to 45 feet in depth. Steel H-Frame structures typically require a borehole up to 6 feet in diameter and up to 40 feet in depth. On average, each footing for an LST and steel H-Frame structure will project approximately 1 to 4 feet above ground level. The actual depth and type of footings will depend on specific site soil conditions and topography, and will be determined during final engineering; however, the maximum anticipated depth below ground surface is 45 feet.

Where excavation of boreholes occurs in soft or loose soil, or if they extended into groundwater, they will be stabilized with casings or mud slurry. Mud slurry will be placed in the hole after drilling to prevent sloughing. The slurry will be pumped into the footing excavation hole. The concrete will then be pumped to the bottom of the excavation hole in a rigid pipe. As the slurry mud is displaced by the concrete, it will be pumped in a contained manner from the excavation hole into a vacuum truck with no spills onto the ground. The drilling/slurry mud will be disposed of at an approved facility, in accordance with applicable regulations.

In areas not accessible by road, equipment and material may be deposited at structure sites using helicopters, or by workers on foot; crews may prepare the footings using hand labor assisted by hydraulic or pneumatic equipment or other methods. Micropiles may be used at several tower locations in the McCullough Pass area. The type of equipment to dig the Micropile foundations will be flown into the tower site by a helicopter. At Micropile locations, the tower structure will also be flown to the tower location by helicopters in sections to be erected.

Prior to drilling excavation holes in California, SCE will contact Underground Service Alert to identify any underground utilities in the construction zone. In Nevada, a similar organization will be contacted for the same purpose.

Following excavation of the foundation footings, steel reinforced cages and stub angles or anchor bolt cables will be set, survey positioning will be verified, and concrete will then be placed. Steel reinforced cages, stub angles, and anchor bolt cages will be assembled at laydown yards and delivered to each structure location by flatbed truck. LST foundations will require between 25 and 100 cubic yards of concrete, depending on the type of structure being constructed. Steel H-Frame structure foundations will require between 80 and 120 cubic yards of concrete.

During construction, existing concrete suppliers will be used when feasible. If no concrete suppliers exist in certain areas, a temporary concrete batch plant will be established. If necessary, SCE will consider setting up a temporary concrete batch plant in a 2-acre site within a material yard. Equipment at the batch plant will include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions will be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

5.5 STRUCTURE ASSEMBLY AND ERECTION

Structural components of the LSTs and steel H-Frames will be bundled and shipped by truck to the construction material yards, and then to the individual sites. LSTs and steel H-Frames will be assembled at construction areas at each structure site, and then erected and bolted to the foundations. Ground disturbance will generally be limited to the construction areas, which will typically occupy an area of 200 feet by 200 feet. At some structure locations, some vegetation may be removed and/or cut down with a mower or construction structure site could be graded.

LST assembly begins with the hauling of steel bundles using trucks with 40-foot trailers and a rough-terrain forklift/crane. After the steel is delivered the construction crew will begin assembling the leg extensions, body panels, boxed sections, and bridges. The steel work will be

completed by a combined erection and torqueing crew with use of a crane. The construction crew may install insulators and conductor rollers/travelers that will be used to support conductor pulling activities.

For steel H-Frame structures, steel work will consist of hauling the poles in sections to their designated sites using trucks with 40-foot trailers and rough-terrain cranes to off load the structures. At the site, the poles will be placed on the foundations once the concrete foundation had been cured. The poles will be partially assembled at the construction area located around each foundation.

Where road access is available, assembled sections of the tower will be lifted into place by a crane. The crane pad, depending on the terrain, will be located in close proximity to the actual tower location.

For structures located in terrain inaccessible to a crane, helicopters may be used for tower foundation support activities and structure erection. Helicopter use is also expected for line stringing activities throughout the project.

The use of helicopters for the erection of structures will be conducted in accordance with SCE's specifications and will be similar to methods detailed in Institute of Electrical and Electronic Engineers 951-1996 *Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction.* The operations area of the helicopters will be limited to helicopter staging areas near construction locations that are considered safe for landing and take offs.

Final siting of helicopter staging areas will be reviewed with input from the helicopter contractor, affected private landowners, and land management agencies. The size of each staging area will depend on the number of structures to be installed and other factors.

5.6 CONDUCTOR INSTALLATION

5.6.1 Wire Stringing

Stringing includes all activities associated with the installation of the transmission line conductors onto the LSTs and/or the steel H-Frames, including the installation of primary conductor and OPGW, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves rollers/ travelers are usually attached to the new structures during the steel erection process. Stringing conductors and OPGWs on new transmission lines will begin once a number of tower structures have been erected and inspected. At most locations, both the conductors and OPGW will be strung from the same stringing site. The dimensions of the area needed for the stringing setups associated with conductor installation will vary depending on structure height and terrain but will not extend beyond the limits of the approved right-of-way and temporary construction areas. Vegetation will be removed where necessary to safely access the site and position conductor stringing equipment. To the extent possible, conductor stringing setup sites will be located on level ground to minimize the need for grading. Please see Figure 13 for the locations of the OPGW stringing sites. Stringing setup sites

will be reclaimed in accordance the approved Reclamation, Restoration, and Revegetation Plan (RRRP).

The following four steps describe the wire stringing activities:

Step 1. Installing the rope or sock line – A lightweight rope line (also known as a sock line) will be connected to the helicopter and installed into travelers/rollers located at each tower location. This process will have to be repeated several times over for each tower because of the multiple conductors and OPGW. On average, the helicopter will operate approximately 10 hours per day during conductor stringing operations.

Step 2. Pulling – The sock line will be used to pull the ¾-inch conductor pulling cable. The ¾-inch cable will then be attached to the bundled conductor with a device called a "running board". The conductor will then be pulled through a single span or through multiple spans that will involve two or more tower structures.

The pulling site, located at one end of the conductor pull, is where the pulling equipment is located. The tensioning site is located at the opposite end of the pulling site and will consist of several large pieces of equipment to support the wire stringing activities. Some of this equipment may include a rope machine, a tensioning machine, or "bull wheel" (used to provide tension on the conductor as it is being pulled off the conductor reel), several flatbed trailers with conductor reel stands mounted on them, and a rough terrain crane to remove/replace conductor reels off of the reel stands.

The puller and tensioner are operated together during the pulling phase to ensure that the conductor is installed in a controlled manner and that conductor-to-ground clearance is maintained.

Conductor pulling locations may occur approximately every 15,000 to 18,000 feet on flat terrain and may be more closely spaced in rugged terrain. Wire pull locations will be selected, where possible, based on the geometry of the line as affected by changes in routing directions, changes in the terrain, and suitability of stringing and splicing equipment setups.

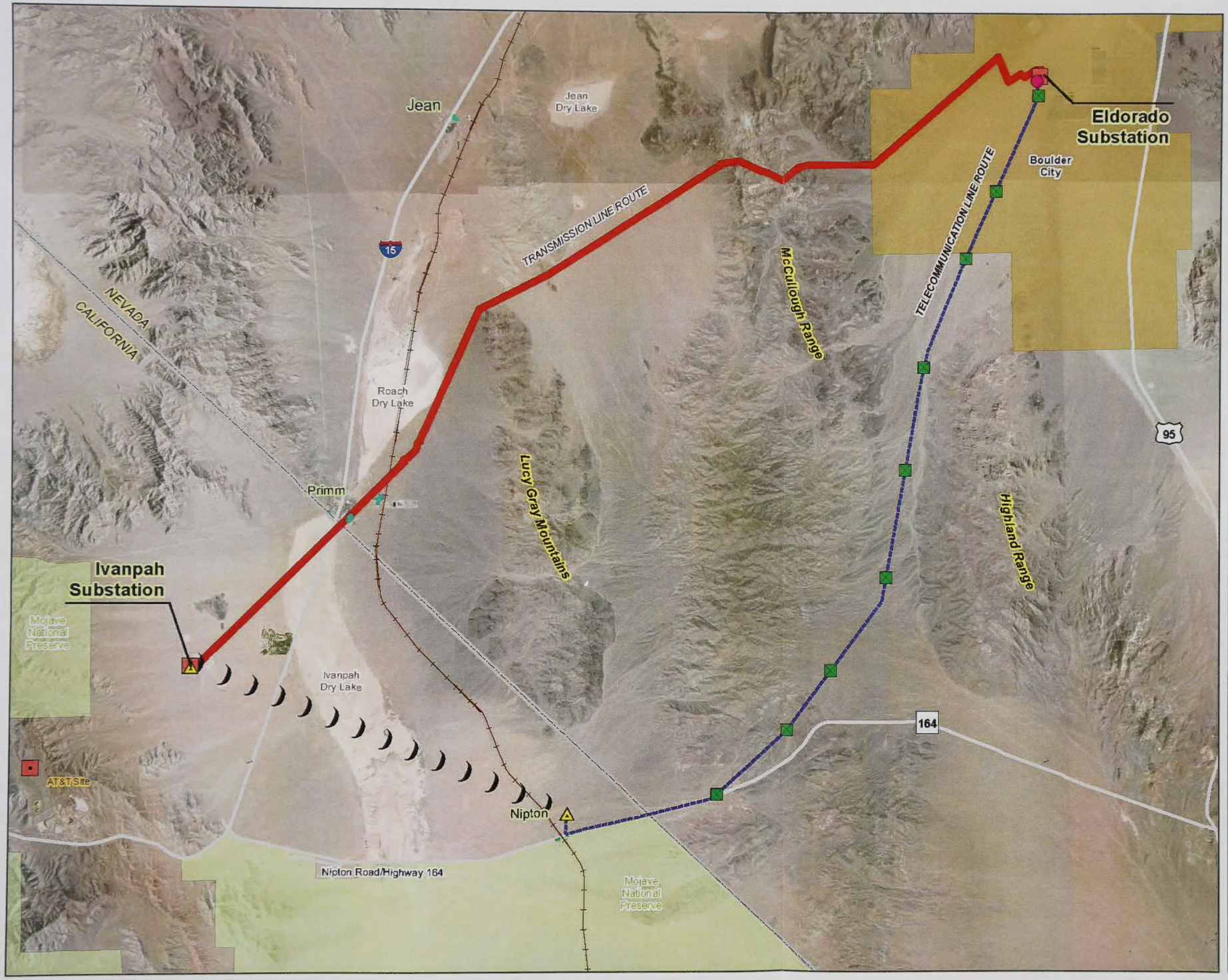
Step 3. Splicing, Sagging, and Dead-ending – Once each conductor is pulled through the length of the transmission line, all temporary pulling splices will be removed and replaced with permanent splices. Conductor splices will occur approximately every 7,500 to 9,000 feet on flat terrain, or more closely in rugged terrain. Once the splicing is complete, the conductor will be sagged to proper tension. After splicing and sagging, conductors will be permanently attached to dead-end towers.

Table 10 Eldorado - Ivanpah OPGW Reconductoring: OPGW Splicing Locations

Pull Number	Mile-Tower	Tower Type	Latitude	Longitude	Construction #	Spans	Line Angle (degrees)	Station	Reel Length (feet)	Notes
	M176-T3	DHA-1			777	-	27.41	815604.0	-	-
1						2			3000	Spans (2) 60 deg. EHA, 47 deg. EHA, 17 deg. & 10 deg. Cap Racks, and a 27.5 deg. DHA.
	M176-T1	ELD-1	35.789	-115.009	775		35.38	813553.6		
2						11			18100	
	M173-T1	EMT-3	35.747	-115.033	764		0.00	796850.3		
3						8			13100	
	M170-T4	EHT-S-1	35.718	-115.050	756		1.85	784990.4		
4						13			20200	Spans one 9.5 degree ELA Tower
	M167-T2	EHT-S-1	35.670	-115.073	743		1.58	766187.9		
5						12			18000	Spans one 1.5 degree EHT-S Tower
	M164-T1	EMT-2	35.625	-115.084	731		0.00	749539.7		
6						13			18900	
	M160-T5	EMT-1			718		0.00	732010.1		
7						14			19000	Spans one 2 degree EHT-S Tower and one 25 degree ELD Tower
	M157-T2	EMT-3	35.537	-115.126	704		0.00	714417.0		
8						9			13100	
	M155-T2	ELA-3	35.512	-115.150	695		11.47	702591.5		
9						13			16600	
	M152-T2	EHT-S-2			682		0.00	687350.0		
-						-			-	-

Eldorado-Ivanpah Transmission Project

Figure 13
Pole Stringing Locations



LEGEND

- Pole Stringing Location
- Rack
- Substations
- Microwave Tower
- Laydown Yards
- Transmission Line Route
- Telecommunication Line Route
- Railroads
- Streets/Highways
- State Boundary
- Mojave National Preserve
- Microwave Signal

0 2 4 Miles
0 2 4 Kilometers
1:180,000 1 inch = 15,000 feet

SCE Corp Environment, Health & Safety
Eldorado-Ivanpah Transmission Project
Projection: NAD 83 UTM Zone 11N
Date: 10/4/2011

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Path: Z:\Projects\EITP\ArcGIS\Final\stringing locations.mxd

Step 4. Clipping-in and Spacers – After the conductor is dead-ended, the conductors will be attached to all tangent structures, a process called clipping-in. Once this is complete, spacers will be installed to maintain uniform separation between the bundled conductors.

OPGW will be installed above transmission lines for shielding and will be used for communications as described in Section 5.10.1. On the Eldorado-Ivanpah 220-kV transmission line, the pulling and tensioning sites will be used for both conductor and the OPGW installation. The stringing activities on the Eldorado-Lugo 500-kV transmission line will be for the removal of one OHGW and the installation of one OPGW. The OPGW is typically installed in continuous segments, each up to 19,000 feet long, if installed in conjunction with the conductor, depending on factors including line direction, inclination, and accessibility. Following installation of the OPGW, the fiber strands in each segment will be spliced to form a continuous length from one end of the transmission line to the other.

Stringing will be conducted in accordance with SCE's specifications, which are similar to process methods detailed in Institute of Electrical and Electronic Engineers Standard 524-2003, *Guide to the Installation of Overhead Transmission Line Conductors*. SCE has provided a list of Eldorado - Ivanpah OPGW Reconductoring: OPGW Splicing Locations (see Table 10) that includes wire pulls and equipment setup positions, reel lengths, line angles and spans to facilitate the safe and quick installation of wire. To protect the safety of workers and the public, safety devices such as grounding, guard structures, and radio-equipped construction vehicles and equipment will be in place prior to initiation of wire-stringing activities.

5.6.2 Pulling and Splicing

The puller, tensioner, and splicing setup locations associated with the project will be temporary and the land will be restored to its previous condition following completion of pulling and splicing activities. The final number and locations of the puller, tensioner, and splicing sites will be determined during final engineering for the project, depending on the construction methods chosen by SCE or its contractor. The puller, tensioner, and splicing setup locations require level areas to allow for maneuvering of the equipment. When possible, existing level areas and existing roads will be used, to minimize the need for grading and cleanup.

The preferred areas needed for pulling, tensioning, and splicing equipment set-up sites are:

- 500 by 150 feet for tensioning equipment;
- 200 by 150 feet for pulling equipment; and
- 150 by 100 feet for splicing equipment.

However, crews can work from within slightly smaller areas when space is limited.

At OPGW splice locations, the fiber cables will be routed down a tower leg where the splicing occurs. The splices will be housed in a splice box (typically a 3-foot by 3-foot by 1-foot metal enclosure) that is mounted to one of the structure legs some distance above the ground. On the last structure at each end of the transmission line, the OPGW is spliced to a section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

5.7 SUBTRANSMISSION LINE CONSTRUCTION

At the transition point of the transmission line route going north into the Ivanpah Substation, seven existing lattice H-Frame structures will be removed and replaced with one single-circuit engineered TSP (Figure 8) and seven LWS H-Frames (Figure 7) within the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line right-of-way. In addition, seven LWS H-Frames will be installed at replaced structures, to meet current requirements.

Approximately three single-circuit engineered TSPs will be installed. These TSPs will require concrete footings. The LWS H-Frames will be buried and backfilled with native soils. One circuit of 653.9 ACSR (three phases per circuit, one conductor per phase) and one 3/8-inch EHS shield wire will be placed on the new poles.

Construction of these structures will follow the general steps described in Section 5.4 for site preparation, foundation installation, structure assembly, and conductor installation. The final step in completing construction of the new 115-kV subtransmission line segment will be to energize the new conductor. To accomplish this, the existing lines in service will be de-energized and the connections to the new segment will be made.

At the transition point of the proposed Project transmission line route going north into the Ivanpah Substation, seven existing LST H-Frame structures would be removed and replaced with one single-circuit engineered TSP and six LWS H-Frames within the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV transmission line right-of-way. In addition, six LWS H-Frames would be installed at replaced structures, to meet current requirements.

Approximately three single-circuit engineered TSPs (including the one noted above) would be installed and looped in to the proposed Ivanpah 115-kV rack position. These TSPs would require concrete footings. The LWS H-Frames would be buried and backfilled with native soils. One circuit of 653.9 ACSR (three phases per circuit, one conductor per phase) and two 3/8-inch high-strength shield wires would be placed on the new LWS H-Frame poles. TSPs would only have one 3/8-inch shield wire where applicable (three spans).

In addition, SCE will design, construct, own, operate, and maintain three 115-kV generation tie lines outside of the Ivanpah substation to the ISEGS's structure outside of the 400-foot transmission corridor. The first will be approximately 500 feet from the customer's underground to the overhead structure to Ivanpah substation 115-kV rack. The second and third 115-kV generation tie lines will be approximately 1650 feet in length and extend from customers overhead structure to the new Ivanpah substation 115-kV rack.

Construction of these structures would follow the general steps previously described for site preparation, foundation installation, structure assembly, and conductor installation. The final step in completing construction of the new 115-kV subtransmission line segment would be to energize the new conductor. To accomplish this, the existing lines in service would be de-energized and the connections to the new segment would be made.

In the event that all the steel poles are not available when necessary, SCE will install temporary wood poles, anchors, guying, conductor, and shield wire to connect customer generation tie line and SCE existing 115-kV transmission line for early interconnection. The existing transmission line is the Coolwater-Baker-Dunn Siding-Mtn Pass-Eldorado 115-kV line

SCE proposes to install approximately two single-circuit dead-end berry poles, a single-circuit triangle configuration pole, and a single-circuit three-pole angle dead-end structure. Poles will range in height from 60 to 75 feet and will be constructed of wood and contain conductor, shield wire, insulators, and line hardware consistent with transmission line construction. Anchors and guying will be required to support poles with unbalanced loads.

5.8 DISTRIBUTION LINE CONSTRUCTION

A 33-kV distribution line will be installed to provide reliable lighting and power service to the new Ivanpah Substation. This component will consist of approximately one mile of new overhead and underground 33-kV circuitry and two new remote control switches that will be installed adjacent to Densmore Drive at the California state line, near Primm, Nevada. One of the switches will be located south of the Ivanpah Substation and the second will be located next to the Primm Valley Golf Club's Desert Course.

Ivanpah Substation power will be served from approximately 400 feet of new ducts and one run of cable from the Nipton 33-kV circuit to the location of the new station light and power transformer in the Ivanpah Substation. The exact location of the transformer will be determined during final engineering.

In addition, approximately 4,300 feet of a new 33-kV overhead line will be installed between the town of Nipton and the new microwave site proposed to be located northeast of Nipton. A transformer will be installed on this overhead line connecting to the microwave site using an underground duct. The line will be installed along the side of an existing unnamed dirt road.

SCE is constructing a 33-kV distribution line from Nipton to the new microwave tower site with typical overhead configuration. One new distribution pole needs to be interset just outside of Mountain Pass Substation in order to create additional clearance to accommodate the new SCE telecommunications cable.

Due to the previous construction of a berm by ISEGS adjacent to the southwest corner of Ivanpah Substation, there is a need to increase the clearance of the existing 33-kV conductors over the ground. In addition, the 115-kV conductors are proposed to cross the existing 33-kV conductors near this location. Therefore, a new 33-kV pole is proposed to be interset to keep the 33-kV conductors near their existing height at the 115-kV crossing and then approximately two existing wood poles would be replaced (and possibly relocated) with taller wood poles in order to provide additional clearance over the berm. The first pole, with conductors, will be double dead-ended and secured with tie downs and anchors. The second pole will have double arms attached approximately five feet from the top of the pole and the conductors will be double dead-ended. Both new poles will be placed between the fence and the bottom of the berm inside the existing Right of Way. An existing pole will likely remain as is. Double arms will be lowered

approximately five feet from top of pole and conductors double dead-ended. This work is necessary to provide a path for Transmission to enter the Substation

Likewise, two wood poles on Coloseum Road would need to have pole-top-extensions installed or be replaced with taller wood poles in order to provide additional clearance between the 33-kV line and Coloseum Road. Also, two new poles would need to be interset south of Coloseum Road to accommodate clearance requirements for the future roadway.

5.8.1 Distribution Structure Assembly and Installation

Structural components of the distribution equipment will be shipped by truck to the construction material yards and then trucked to the individual sites. Poles and associated equipment will then be erected along the required routes. Ground disturbance will generally be limited to the construction areas. The ground disturbance for each pole installation will typically be approximately 4.9 square feet per pole and 0.1 square feet per pole anchor. At some structure locations, some vegetation could be removed and/or cut down to accommodate installation of overhead and/or underground distribution facilities.

5.8.2 Wire Stringing

Wire stringing includes all activities associated with installation of the distribution line conductors onto the distribution poles, including the installation of primary conductor, insulators, and dead-end hardware assemblies. These installations may also include vibration dampeners, weights, spacers and fault indicators. Insulators and stringing sheaves (rollers/ or travelers) may be attached to the conductors as part of the stringing activity, as they are attached to the new structures, during the distribution pole erection process. The dimensions of the area needed for the stringing setups associated with conductor installation will vary depending on structure height and terrain conditions, but will not extend beyond the limits of the approved temporary construction use areas. Vegetation will only be removed where necessary to safely access the site and set up conductor stringing equipment. To the extent possible, stringing setup sites will be located on level ground to minimize the need for grading.

5.8.3 Underground Installation

Underground structures and conduit would be installed prior to the underground distribution cable. A trench roughly 4 feet deep and 2 feet wide would be dug along all underground distribution power line routes, to facilitate installing conduit for cable from structure to structure, structure to pole and/or structure to the substation fence line. Typically four 6-inch conduits would be placed inside the trench from the structure to the next distribution structure, pole or substation fence line as required. A layer of slurry would be poured over the conduit for additional protection, and the dug-up soil would be used to backfill the trench. For installation of underground structures, an area of approximately 900 square feet at the site would typically be excavated. The required structure would be placed in the excavated site. Once the structure is in place all associated work such as conduit termination, structure attachments (vent pipes, structure covers and/or other assemblies) would be installed in/on the structure.

Typically at the transition of the installation of the overhead to underground distribution facilities, on the last pole (transition/dip pole), the overhead distribution power line would be spliced to a section of distribution power cable. This cable would run in a conduit down the transition pole from overhead into an underground distribution structure located in proximity to the transition/dip pole. The distribution underground cable would then be installed in the conduit and structures. To install the distribution power cable in existing and new underground conduits, a process of pulling the cable through these conduits would be used. The distribution power cables may be terminated as required on distribution underground equipment.

5.9 IVANPAH SUBSTATION CONSTRUCTION

Construction of the Ivanpah Substation will involve the following steps:

- Site preparation;
- Excavation;
- Substation equipment installation;
- Paving;
- Rock surfacing;
- Spill prevention, control, and countermeasure designs;
- SWPPP preparation; and
- Fencing and security.

5.9.1 Site Preparation

The substation area will be a 1,650-foot by 1,015-foot rectangle, covering approximately 38.5 acres. It will be bounded by SCE's existing 115-kV right-of-way on the southwestern side and the authorized ISEGS project area on BLM land on the other three sides (Section 1.2); however, these areas are currently undeveloped.

Grading of the substation site and an access road to the site will be completed as part of the scope of the ISEGS project facilities described in Section 3.2, and will include grading of the 885-foot by 850-foot substation site and the 10-foot perimeter buffer. In addition, the ISEGS scope will grade the following areas at the substation site: the entire 17-acre substation pad, the cut and fill side slopes to blend the existing terrain with the new pad, and an earthen berm along the upslope pad boundaries to protect the substation from stormwater runoff. In addition, the substation access roads and surface flow diversion/control measures will be graded and installed as part of the ISEGS project.

Two transmission line access areas will be included within the substation site, approximately 1,015 feet by 400 feet (approximately 9 acres) each. These areas will provide room for the 115-kV and 220-kV transmission lines to turn into the station from the adjacent right-of-way.

Land disturbance for the project substation construction will be limited to the actual structure erection locations, staging/pulling areas, and unpaved access roads. Other site preparation activities will include:

- Final grading;
- Installation of approximately 3,500 feet of 8-foot-high perimeter fence with barbed wire surrounding the entire substation pad, and one 30-foot-wide rolling gate; and
- Installation of a new conductor ground grid to cover the entire pad.

5.9.2 Excavation

After the substation site is graded, excavation will be required to install below-grade facilities, including a ground grid, conduit, trenches, and equipment structure foundations. The design of the substation ground grid will be based on soil resistivity measurements collected during a geotechnical investigation that will be conducted prior to construction. Approximately 145 foundations of various sizes will be constructed throughout the substation pad to support equipment and steel structures. In addition, a network of partially buried concrete trenches and a buried grounding grid will be installed. Excavations of these foundations and trenches will begin following the completion of grading and other yard improvements, and will continue for several months. The estimated total volume of soil that will need to be excavated for foundation and trenches is 1,250 cubic yards; the soil will be spread on a portion of the substation property.

5.9.3 Substation Equipment Installation

Following the excavation and below-grade construction, installation of substation equipment and ancillary facilities (buses, disconnecting switches, circuit breakers, transformers, steel structures, microwave tower [see Section 5.10.4], and the MEER) will take place. The transformers will be delivered by heavy-transport vehicles and escorted by contracted traffic control. Because of their size and weight, each transformer will be moved to its dedicated concrete foundation by towing it from the transport vehicle along temporary steel beams onto the foundation and lowered into place. The MEER will be approximately 62 feet by 74 feet with three rooms: a control room, a communication room, and a station battery room.

5.9.4 Paving

Asphalt concrete paving will be applied to internal driveways over an aggregate base material and a properly compacted sub-grade, as recommended by the geotechnical investigation during final engineering. Asphalt concrete paving will be installed after all major construction has been completed.

5.9.5 Rock Surfacing

All areas within the substation perimeter that were not paved or covered with concrete foundations or trenches will be covered with a 4-inch layer of untreated, ¾-inch crushed rock. The rock will be applied to the finished grade surface after all construction has been completed.

5.10 TELECOMMUNICATION SYSTEM INSTALLATION

Installation of the OPGW may occur simultaneously at multiple locations and this could involve multiple construction crews. Modifications of the existing Eldorado-Lugo 500-kV towers might include reinforcing or extending the structure body, installing horizontal diaphragms, reinforcing of ground wire peaks and knee braces above the waist, and reinforcing structure legs. SCE has developed detailed engineering drawings and procedures for fabrication and installation for each structure requiring modifications.

These modifications to the identified structures will be identified by steel bundles. Each bundle will contain those components necessary to complete the required modifications, such as new steel angles to stiffen the ground wire peaks and provide out of plane support of the knee braces, and to form back-to-back angles to the existing leg diagonals, redundant braces to the longitudinal and transverse faces, oblique braces between leg diagonals, and a new horizontal diaphragm. New redundant members will also be designed and installed at the ground peaks to support the OPGW clip-in hardware. The loading capacity of the upgraded structures will be able to support the loads for the new OPGW installation and meet the requirements of CPUC GO 95 (State of California) and the National Electric Safety Code (State of Nevada). Final structure modification and associated construction activities will be determined once final engineering is completed.

5.10.1 Optical Ground Wire Installation

For project communications, OPGW segments will be installed on both the Eldorado-Ivanpah 220-kV transmission line structures (Telecommunication Path 1), and along 25 miles of the Eldorado-Lugo 500-kV transmission line (Telecommunication Path 2, Section 1). OPGW installation will be performed in the same manner as the conductor installation, as described in Section 5.6. OPGW is typically installed in continuous segments, each up to 20,200 feet long, depending on various factors including line direction, inclination, and accessibility. For Telecommunication Path 1, the pulling and tensioning sites will be the same as those for the 220-kV conductor installation. For Telecommunication Path 2, the stringing activities on the existing Eldorado-Lugo 500-kV line will be conducted for the OPGW installation only.

Following installation of the OPGW, the strands in each segment will be spliced to form a continuous length from one end of the transmission line to the other. At a splice structure, the fiber cables will be routed down the structure leg where the splicing will occur. The splices will be housed in a splice box (typically a 3-foot by 3-foot by 1-foot metal enclosure) mounted to one of the structure legs some distance above the ground.

5.10.2 Underground Installation

Following installation of the OPGW, at some crossings with other utilities and on the last tower at each end of a transmission line, the overhead fiber will be spliced to another section of fiber cable that will run in underground conduit from the splice box into its designated structure or the communication room inside the adjacent substation. To install the fiber optic cable in existing and new underground conduits, a high-density polyethylene smooth-wall innerduct will be used

to facilitate installation and to protect and help identify the cable. The innerduct will be installed first inside the conduit, and then the fiber optic cable will be installed inside the innerduct.

Connecting the OPGW with the substation will require several steps. The splice box will be mounted 20 to 30 feet above ground on the last transmission structure to the substation fence line. About 25 feet of 5-inch vertical riser conduit will be installed to reach the splice box from the ground. A trench roughly 3 feet deep and 1.5 feet wide will be dug from the structure to the substation fence line. A 5-inch conduit will be placed inside the trench from the structure to the substation fence line. A layer of slurry will be poured over the conduit for additional protection, and the dug-up soil will be used to backfill the trench.

At the substation fence line, the conduit will be connected to a trench inside the substation. Non-conducting optical riser-type fiber cable will be pulled from the substation MEER to the splice box located on the last transmission structure. After the OPGW and non-conducting optical riser-type fiber cables are spliced, the splice case will be placed inside the splice box. Approximately 40 by 60 feet of work area, two splice trucks with pulling equipment, and a four-person crew will be required for the underground cable installation. In addition, a three-person crew will be required to complete the fiber optic splicing.

5.10.3 Fiber Optic Cable Installation

The overhead fiber optic cable will be installed by attaching cable to structures in a manner similar to that described above for the transmission line stringing. Installation will involve attaching the cable to cross arms on distribution poles. This will require the use of a bucket truck. One four-person crew and two trucks will be used. Typically, a crew can install up to 2,000 feet of cable and complete three splices in one day.

Overhead fiber optic cable stringing includes all activities associated with the installation of cables onto cross arms on existing wood pole structures. This activity includes installation of vibration dampeners and suspension and dead-end hardware assemblies. Stringing sheaves (rollers or travelers) will be attached during the framing process. As part of SCE's standard wire stringing plan, the fiber optic installation will follow a sequenced program of events starting with determination of the number of cable pulls and cable pulling equipment setup positions, pulling locations, times, and safety protocols needed for safe and quick cable installation.

Fiber optic cable pulls typically occur every 10,000 to 20,000 feet over flat or mountainous terrain. Fiber optic cable splices are required at the ends of each cable pull. Fiber optic cable pulls are the length of any given continuous cable installation process between two selected points along the existing overhead or underground structure line. Fiber optic cable pulls are selected, where possible, based on availability of pulling equipment and designated dead-end structures at the ends of each pull; geometry of the line as affected by points of inflection; terrain; and suitability of fiber optic cable stringing and splicing equipment set ups. The pulling and splicing sites used for transmission line installation will be used for the fiber optic cable stringing and splicing. Poles that are not accessible from the existing service road workers on foot will install the fiber optic line on these poles.

5.10.4 Installation of Microwave Tower and Communication Site

An approximately 100-foot by 100-foot area will be required for constructing the new communication site north of the town of Nipton. Chain link fencing will be installed around the communication site perimeter. A typical communication site consists of a communication building, microwave tower, and generator/fuel tank. A typical communication building is either a block wall-type building to be constructed on site or a prefabricated building delivered to the site. Prefabricated buildings are set on a concrete foundation using a crane. The typical building size is 36 feet by 12 feet; the building consists of a generator room and an equipment room. The generator room houses an emergency backup generator and manual/automatic alternating current switch equipment. Dimensions of the communication building will be determined during final engineering design.

Microwave equipment, DC power equipment, and other telecommunication equipment will be installed in the communication room/MEER. A separate concrete pad with a 10-foot separation from the communication room will be constructed for fuel tank installation.

The required area for a typical free-standing, four-legged lattice steel microwave communication tower is approximately 29 feet by 29 feet. For the project, the microwave tower will be built within the fenced area of the Ivanpah Substation, next to the MEER or outside the communication room. Concrete footings will be installed to support the tower. Heavy equipment needed for construction will include ready-mixed concrete trucks for the footings, and a crane for tower erection and antenna installation. Tractor-trailer vehicles will be used to transport steel tower components. A six- to eight-person crew might be on site at any given time for tower construction and antenna installation.

Construction of the new communication site will take approximately 6 months and will consist of the following steps:

- Prepare site;
- Erect temporary fencing;
- Set the foundations;
- Install prefabricated building, fuel tanks, and emergency generator;
- Erect the antenna tower (where necessary);
- Install telecommunication equipment and/or antennas;
- Erect permanent fencing; and
- Clean up the site.

The existing roads may require reconstruction prior to construction activities. Reconstruction work may include clearing, grading, and compacting the existing roads to remove potholes, ruts, and other surface irregularities to provide a smooth and dense surface capable of supporting heavy equipment. Specific locations for reconstruction works will depend on impacts of weather conditions over the existing roads.

5.11 CONSTRUCTION YARDS AND HELICOPTER STAGING LOCATIONS

Project construction will begin with the establishment of approximately six temporary construction yards and two helicopter fly yards located at strategic points along the route. Two construction yards will be in California and four in Nevada. The location and current condition of each yard and landing site are listed in Table 11. SCE or its contractors might use additional construction yards.

Table 11 Construction Yards and Helicopter Staging Locations

No.	Location	MP	Distance to Right-of-way (miles)	Current Condition	Area (acres)(1)
CY 1	Eldorado Substation, NV	0	0	Previously disturbed	10.0
CY 2	Jean, NV	15	11.5	Previously disturbed	14.0
CY 3	Generating Station Yard (Bighorn), NV	27	0.4	Previously disturbed	14.0
CY 4	Primm Valley Casino Vacant Lot, NV	28	0.1	Previously disturbed	25.0
CY 5	ISEGS (Ivanpah) Generating Station Yard, CA	35	0	Disturbed(2)	10+
CY 6	Nipton, CA	n/a	4.7	Previously disturbed	10.0
CY 7 (HL 1)	McCullough (East of McCullough Pass)		0.2	Not disturbed	5.0
CY8 (HL 2)	Crossroads (West of McCullough Pass)	15	0.01	Not disturbed (4)	5.7

Notes:

(1) Approximate areas based on current design; (2) Only Construction Yard #5, CY 7, and CY8 are located on public (BLM) land

Key:

CY = Construction Yard MP = Milepost

HL = Helicopter Landing site N/A = not applicable

Each yard will be used as a reporting location for workers, vehicle and equipment parking, and material storage. The yards will have offices for supervisory and administrative personnel. Maintenance of construction equipment will be conducted at these yards.

The number of workers reporting to any one construction yard is not expected to exceed approximately 100 workers at any time. Construction yards will range between 5 and 25 acres,

depending on land availability and intended use. Construction of the Ivanpah Substation will not require a temporary laydown area outside the substation fenced area.

SCE will arrange temporary electrical and telephone connections at the construction yards with local electrical and communication service providers, if available. Water will be provided by local vendors. During the peak construction period, approximately 80 private commuting vehicles and the construction vehicles/equipment will be parked at the construction yards. Crews will load materials onto work trucks and drive to the current construction location. At the end of each day, crews will return to the yard in their work vehicles and depart in their private vehicles. Materials stored at the construction yards will include:

- Conductors;
- Wood poles;
- OPGW cable;
- Hardware;
- Construction equipment;
- Steel structural components;
- Insulators;
- Signage;
- Fuel;
- Joint compound;
- SWPPP materials, such as straw wattles, gravel, and silt fences; and
- Waste materials for recycling or disposal.

Due to greater efficiency and lower cost, SCE will use conventional ground-supported access construction methods for the transmission line construction. Helicopters will also be used during the construction of the transmission line and OPGW activities. SCE will develop a preliminary access plan and detailed engineering design to identify specific structures and/or portions of the transmission line that will require helicopters as an alternate method of construction. Final location of helicopter staging areas for the project will be determined with the input from the helicopter contractor and affected private landowners and land management agencies.

During stringing activities, preliminary helicopter operations will be based at the Jean Sport Aviation Center in Jean, Nevada, construction yards, and on roads adjacent to the pulling/tensioning sites. Helicopter fueling will occur at staging areas or at the local airport using the helicopter contractor's fuel truck, and will be supervised by the helicopter fuel service provider. The helicopter and fuel truck will stay overnight at a local airport, under security measures to be implemented by SCE in coordination with the Clark County Department of Aviation (CCDOA) or at a staging area if adequate security is in place. Use of the existing Jean Sport Aviation facilities for helicopter staging and fueling will require coordination between the applicant and the CCDOA.

5.12 CLEANUP

SCE will restore all areas that are temporarily disturbed by project activities (including material staging yards, pulling and tension sites, and splicing sites) following the completion of construction. Restoration will be conducted in accordance with the RRRP in Appendix A. In addition, all construction materials and debris will be removed from the area and recycled or properly disposed of, off site. The BLM will require SCE to further mitigate project disturbance by conducting restoration monitoring for a given period after reclamation, to ensure that cleanup activities are successfully completed and satisfactory reclamation is achieved.

Any impacts to existing roads as a result of construction will be repaired once construction was complete. The following tables list the disturbance areas for the construction of the project.

Table 12 Disturbance Table – 500-kV OPGW

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Retrofit Existing LST (1)	9	150 feet x 150 feet	4.6	4.6	0
OPGW Stringing Setup Area - Tensioner (2)	9	325 feet x 50 feet	3.4	3.4	0
OPGW Stringing Setup Area - Puller (2)	8	325 feet x 50 feet	3	3	0
Nipton - Material & Equipment Staging Area	1	approximately 10 acres	10	10	0
Total Estimated (3)			21.0	21.0	0

Notes:

1. Includes structure assembly, erection, and OPGW installation; area to be restored after construction, existing portion of right-of-way within 25 feet of the LST footings to remain cleared of vegetation; the 2.2 acres is pre-existing permanently disturbed area around existing structures for ongoing operations and maintenance access by SCE.

2. Based on 20,000-foot OPGW reel lengths, and route design.

3. Disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or contractor awarded to project.

Table 13 Disturbance Table – 115/220-kV Transmission					
Project Feature	**Site Quantity**	**Disturbed Acreage Calculation (L x W)**	**Acres Disturbed During Construction**	**Acres to be Restored**	**Acres Permanently Disturbed**
Guard Structures	16	50 feet x 75 feet	1.4	1.4	0
Remove Existing Lattice Steel H-Frame (1)	208	150 feet x 75 feet	53.7	53.7	0
Remove Existing LSTs (1)	13	150 feet x 75 feet	3.4	3.4	0
Remove Existing Wood H-Frame (1)	23	100 feet x 75 feet	4.0	4.0	0
Remove Existing Wood Pole (1)	6	100 feet x 75 feet	1.0	1.0	0
Construct New Lattice Steel Suspension Tower (2)	162	200 feet x 200 feet	148.8	125.3	23.5
Construct New Lattice Steel Dead End Tower (2)	27	200 feet x 200 feet	24.8	19.7	5
Construct New Lattice Steel Heavy Dead End Tower (2)	4	200 feet x 200 feet	3.7	2.9	0.8
Construct New Tubular Steel Double H-Frame (3)	18	200 feet x 200 feet	16.5	13.2	3.3
115-kV Conductor Removal and 220-kV Conductor & OPGW Stringing Setup Area - Puller (4)	25	200 feet x 150 feet	17.2	17.2	0
115-kV Conductor Removal and 220-kV Conductor & OPGW Stringing Setup Area - Tensioner (4)	23	500 feet x 150 feet	39.6	39.6	0

Table 13 Disturbance Table – 115/220-kV Transmission					
Project Feature	**Site Quantity**	**Disturbed Acreage Calculation (L x W)**	**Acres Disturbed During Construction**	**Acres to be Restored**	**Acres Permanently Disturbed**
220-kV Conductor Splicing Setup Areas (4)	9	150 feet x 100 feet	3.1	3.1	0
New Access Roads (5)	1.7	linear miles x 18 feet wide	3.7	0	3.7
New Spur Roads (5)	1.4	linear miles x 18 feet wide	3.1	0	3.1
Eldorado Sub - Material & Equipment Staging Area	1	approximately 10 acres	0	0	0
Jean, NV - Material & Equipment Staging Area	1	approximately 14 acres	14	14	0
Ivanpah Sub - Material & Equipment Staging Area	1	approximately 10 acres	0	0	0
McCullough - Material & Equipment Staging Area	1	approximately 5 acres	5	5	0
Crossroads - Material & Equipment Staging Area	1	approximately 6 acres	6	6	0
Total Estimated (7)			348.9	309.5	39.4

Notes:

1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2feet below ground surface.

2. Includes foundation installation, structure assembly and erection, conductor and OPGW installation; area to be restored after construction, portion of right-of-way within 25 feet of the LST to remain cleared of vegetation, would be permanently disturbed for each LST (Suspension=0.145 acres; Dead End=0.187ac; Heavy Dead End=0.188ac).

3. Includes structure assembly and erection, conductor and OPGW installation; area to be restored after construction, portion of right-of-way within 25 feet of the tubular steel double H-Frame to remain cleared of vegetation, 0.185 acre would be permanently disturbed for each tubular steel double H-Frame.

4. Based on 9,000-foot conductor reel lengths, number of circuits, and route design.

5. Based on length of road in miles by road width of 14 feet with 2 feet of shoulder on each side of road.

6. Sites to be used in support of helicopter construction activities.

7. Disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new

Table 13 Disturbance Table – 115/220-kV Transmission					
Project Feature	**Site Quantity**	**Disturbed Acreage Calculation (L x W)**	**Acres Disturbed During Construction**	**Acres to be Restored**	**Acres Permanently Disturbed**
access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or contractor awarded to project. Footing / Base Volume and Area Calculations: Heavy Dead End depth 44 feet deep, 4 feet diameter, quantity four per tower: earth removed for footing = 20.48 cubic yards x 4 = 81.92 cubic yards; surface area = 12.57 square feet x 4 = 50.28 square feet Dead End depth 32 feet deep, 3.5 feet diameter, quantity four per tower: earth removed for footing = 11.40 cubic yards x 4 = 45.61 cubic yards; surface area = 9.62 square feet x 4 = 38.48 square feet Suspension depth 20feet deep, 3.25feet diameter, quantity four per tower: earth removed for footing = 6.15 cubic yards x 4 = 24.60 cubic yards; surface area = 8.30 square feet x 4 = 33.20 square feet Double H-Frame depth 40feet deep, 6feet diameter, quantity four per Double H-Frame: earth removed for footing = 41.89 cubic yards x 4 = 167.56 cubic yards; surface area = 28.28 square feet x 4 = 113.12 square feet					

Table 14a Disturbance Table –Distribution Line Loop along Densmore Drive (with poles and anchors)					
Project Feature	**Quantity**	**Each Disturbed Area (L x W)**	**Acres Disturbed During Construction**	**Acres Temporarily Disturbed**	**Acres Permanently Disturbed**
Underground trench/duct for conduit	1	2,800 feet x 2 feet	0.13	0.13	0.00
Distribution line excavation pits	4	10 feet x 17 feet	0.02	0.02	0.00
Construction equipment work space	1	2,800 feet x 28 feet	1.80	1.80	0.00
Distribution line vault covers	4	4 feet x 5 feet	0.002	0.00	0.002
Distribution line vent pipes	8	0.55 square feet	0.0001	0.0	0.0001
Distribution line poles and anchors	8	2.5 feet diameter (5.0 square feet)	0.001	0.00	0.001
Total			1.9531	1.95	0.0031

Table 14b Disturbance Table – Distribution Line for Microwave Telecommunication Site					
Project Feature	**Quantity**	**Each Disturbed Area (L x W)**	**Acres Disturbed During Construction**	**Acres Temporarily Disturbed**	**Acres Permanently Disturbed**
Underground trench/duct for conduit	1	10 feet x 2 feet	0.002	0.002	0.00
Construction equipment work space	1	10 feet x28 feet	0.026	0.026	0.00
Work area pulling of 4,300 feet of 1/0 ACSR pole line construction	10	40 feet x 60 feet	0.55	0.55	0.00
Area for poles and anchors	19	2.5 feet diameter (5.0 square feet)	0.002	0.00	0.002
Total			0.58	0.578	0.002
Assumptions: Assume that the trench for secondaries from the dip pole to the fence line of the MW site is estimated at 10 feet. Equipment for digging the trench consists of one backhoe Assume 10 work area locations for wire stringing					

Table 14c Disturbance Table – Distribution Poles on Coloseum Road					
Project Feature	**Quantity**	**Each Disturbed Area (L x W)**	**Acres Disturbed During Construction**	**Acres Temporarily Disturbed**	**Acres Permanently Disturbed**
Area for poles and anchors	3	2.5 feet diameter (5.0 square feet)	0.0002	0.00	0.0002
Total			0.0002	0.00	0.0002

Table 14d Disturbance Table – Distribution Poles on Berm
Note that the Berm area has already been previously disturbed. Therefore, no disturbance table is required.

Table 14e	Disturbance Table – Distribution Pole at Mountain Pass Substation				
Project Feature	**Quantity**	**Each Disturbed Area (L x W)**	**Acres Disturbed During Construction**	**Acres Temporarily Disturbed**	**Acres Permanently Disturbed**
Area for poles and anchors	1	2.5 feet diameter (5.0 square feet)	0.0001	0.00	0.0001
Total			0.0001	0.00	0.0001

Table 14f	Disturbance Table – Distribution Work for 33-kV Line Segment to Ivanpah Substation, Station Light and Power				
Project Feature	**Quantity**	**Each Disturbed Area (L x W)**	**Acres Disturbed During Construction**	**Acres Temporarily Disturbed**	**Acres Permanently Disturbed**
Underground trench/duct for conduit	1	161 feet x 2 feet	0.007	0.007	0.00
Construction equipment work space	1	161 feet x 28 feet	0.1	0.1	0.00
Work area pulling of 400 feet distribution underground cable	1	40 feet x 60 feet	0.055	0.055	0.00
Area for poles and anchors	1	2.5 feet diameter (5.0 square feet)	0.0001	0.00	0.0001
Total			0.1621	0.162	0.0001

Table 14g Disturbance Table – 8 miles All Dielectric Self Supporting from Ivanpah Substation to Mountain Pass					
Project Feature	**Quantity**	**Disturbed Acreage Calculation (L x W)**	**Acres Disturbed During Construction**	**Acres to Be Restored**	**Acres Permanently Disturbed**
200 feet of underground cable duct for fiber cable entry to Ivanpah Substation	1	1.5 feet x 200 feet	0.0069	0.0069	0

5.13 LANDSCAPE REHABILITATION

The purpose of the RRRP is to guide restoration and revegetation activities for all lands disturbed by construction of the project and the eventual termination and decommissioning of the project. The RRRP also provides details on topsoil segregation and conservation, seed bank replacement, vegetation treatment and removal, salvage of succulent species, revegetation methods including seed mixes, rates and transplants, and criteria to monitor and evaluate revegetation success. Post-construction monitoring is to last for 1 to 5 years, depending on the disturbance level and restoration level as outlined in the BLM's 2001 *Restoration Plan for Energy Projects in the Las Vegas Field Office*. Consultation with and review by the BLM and the CPUC facilitated development of the RRRP.

5.14 LABOR AND EQUIPMENT

The project will be managed by SCE's Project Management Organization, using both SCE's and contract personnel. The estimated number of workers and construction equipment per project component is summarized in Table 15, 16, 17, and 18. At some stages of the project, multiple locations will be under construction simultaneously. This might involve independent construction crews working at different locations along the project.

A lay-down area on the SCE-owned Ivanpah Substation site will be required to store materials needed during construction. Two line trucks, each with a four-person crew (eight people total), will be called upon to perform the underground fiber optic cable work.

5.15 PROJECT CONTACTS

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Table 15 Construction Equipment and Workforce Estimates by Activity Retrofit Existing 500-kv T/L Towers & OPGW Installation (Path 2, Section 1)							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Material Yard (1)				4			
1-Ton Truck, 4x4	300	Gas	1		Duration of project	8	
Boom/Crane Truck	350	Diesel	1			4	
Rough Terrain Forklift	125	Diesel	1			4	
Truck, Semi, Tractor	400	Diesel	1			2	
Road Work (2)				5	17		25 Miles
1-Ton Truck, 4x4	300	Gas	2		17	3	1.5 Miles/Day
Motor Grader	250	Diesel	1		17	4	
Track Type Dozer	150	Diesel	1		17	6	
Drum Type Compactor	100	Diesel	1		17	4	
Water Truck	300	Diesel	1		Duration	8	
Lowboy Truck/Trailer	450	Diesel	1		9	2	
Backhoe/Front Loader	125	Diesel	1		17	6	
LST Steel Haul (3)				4	9		9 LSTs
1-Ton Truck, 4x4	300	Gas	2		9	2	1 LST/Day

Table 15 Construction Equipment and Workforce Estimates by Activity Retrofit Existing 500-kv T/L Towers & OPGW Installation (Path 2, Section 1)							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Flat Bed Truck/Trailer	400	Diesel	1		9	8	
Rough Terrain Forklift	125	Diesel	1		9	6	
LST Retrofit (4)				14	9		9 LSTs
3/4-Ton Truck, 4X4	275	Gas	2		9	4	1 LST/Day
1-Ton Truck, 4x4	300	Gas	2		9	4	
Boom/Crane Truck	350	Diesel	2		9	8	
Rough Terrain Crane (M)	215	Diesel	1		9	8	
Manlift/Bucket Truck	250	Diesel	1		9	6	
Compressor Trailer	60	Diesel	2		9	6	
Remove Existing OHGW & Install OPGW (5)				15	72		25 Circuit Miles
1-Ton Truck, 4x4	300	Gas	2		72	8	0.35 mile/day
3/4-Ton Truck, 4x4	275	Gas	4		72	8	
Dump Truck (Trash)	350	Diesel	1		72	2	
Rough Terrain Crane (M)	215	Diesel	1		72	2	

Table 15 Construction Equipment and Workforce Estimates by Activity
Retrofit Existing 500-kv T/L Towers & OPGW Installation (Path 2, Section 1)

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Boom/Crane Truck	350	Diesel	1		72	4	
Puller	350	Diesel	1		48	6	
Manlift/Bucket Truck	250	Diesel	1		36	6	
Static Truck / Tensioner	350	Diesel	1		48	6	
Hughes 500 E Helicopter		Jet A	1		72	8	
Fuel, Helicopter Support Truck	300	Diesel	1		72	4	
Restoration (6)				7	25		25 Miles
1-Ton Truck, 4x4	300	Gas	2		25	2	
Motor Grader	250	Diesel	1		25	6	
Backhoe/Front Loader	125	Diesel	1		25	6	
Drum Type Compactor	100	Diesel	1		25	6	1 Mile/Day
Water Truck	300	Diesel	1		25	8	
Lowboy Truck/Trailer	450	Diesel	1		25	3	

Table 15 Construction Equipment and Workforce Estimates by Activity Retrofit Existing 500-kv T/L Towers & OPGW Installation (Path 2, Section 1)							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Crew Size Assumptions: #1 Marshalling Yards = one 4-man crew #2 Roads & Landing Work = one 5-man crew #3 LST Steel Haul = one 4-man crew #4 LST Steel Assembly = two 7-man crews #5 Remove Existing OHGW & Install OPGW = one 15-man crew #6 Restoration = one 7-man crew							

Table 16 Construction Equipment and Workforce Estimates by Activity Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Survey (1)				4	36		35.5 Miles
1-Ton Truck, 4x4	300	Gas	2		36	8	1 Mile/Day

Table 16 Construction Equipment and Workforce Estimates by Activity
Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Material Yard (2)				4			
1-Ton Truck, 4x4	300	Gas	1		Duration of project	8	
Boom/ Crane Truck	350	Diesel	1			4	
Rough Terrain Forklift	125	Diesel	1			4	
Truck, Semi, Tractor	400	Diesel	1			2	
Roads & Landing Work (3)				5	59		3 Miles & 211 Pads
1-Ton Truck, 4x4	300	Gas	2		59	2	0.5 Miles/Day or 4 Structure Pads/Day
Motor Grader	250	Diesel	1		59	6	
Track Type Dozer	150	Diesel	1		59	6	
Drum Type Compactor	100	Diesel	1		59	4	
Water Truck	300	Diesel	2		Duration	8	
Lowboy Truck/Trailer	450	Diesel	1		30	2	
Backhoe/Front Loader	125	Diesel	1		59	6	
Guard Structure Installation (4)				6	4		16 Structures

Table 16 Construction Equipment and Workforce Estimates by Activity
Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
3/4-Ton Truck, 4x4	275	Gas	2		4	6	4 Structures/Day
1-Ton Truck, 4x4	300	Gas	1		4	6	
Compressor Trailer	60	Diesel	1		4	6	
Auger Truck	210	Diesel	1		4	6	
Pole Truck/Trailer	400	Diesel	1		4	6	
Manlift/Bucket Truck	250	Diesel	1		4	4	
Boom/ Crane Truck	350	Diesel	1		4	8	
Remove Existing Conductor (5)				14	71		35.5 Circuit Miles
1-Ton Truck, 4x4	300	Gas	3		71	8	0.50 mile/day
Manlift/Bucket Truck	250	Diesel	2		71	8	
Boom/ Crane Truck	350	Diesel	2		71	4	
Flat Bed Trailer	N/A	N/A	3		36	2	
Lowboy Truck/Trailer	450	Diesel	1		48	2	
Puller	350	Diesel	1		48	4	
Static Truck/ Tensioner	350	Diesel	1		48	4	

Table 16 Construction Equipment and Workforce Estimates by Activity
Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Remove Existing Towers (6)				6	75		221 Towers
1-Ton Truck, 4x4	300	Gas	2		75	5	3 Towers/Day
Rough Terrain Crane (M)	215	Diesel	1		40	8	
Rough Terrain Crane (L)	275	Diesel	2		75	6	
Compressor Trailer	60	Diesel	2		40	8	
Flat Bed Truck/Trailer	400	Diesel	1		35	8	
Remove Existing Foundations (7)				8	67		208 LSH-Frames & 13 LSTs
1-Ton Truck, 4x4	300	Gas	2		67	8	8 Grillage Foundations/Day Or 4 Concrete Foundations/Day
Dump Truck	350	Diesel	2		67	8	
Backhoe/Front Loader	125	Diesel	2		67	8	
Compressor Trailer	120	Diesel	2		67	8	
Remove Existing Wood Poles (8)				6	7		23 H-Frames & 6 Poles
3/4-Ton Truck, 4x4	275	Gas	2		7	5	8 Poles/Day

Table 16 Construction Equipment and Workforce Estimates by Activity Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
1-Ton Truck, 4x4	300	Gas	1		7	5	
Boom/Crane Truck	350	Diesel	1		7	6	
Pole Truck/Trailer	400	Diesel	2		7	8	
Install LST Foundations (9)				18	128		193 LSTs
1-Ton Truck, 4x4	300	Gas	4		128	2	
Boom/Crane Truck	350	Diesel	2		128	5	
Backhoe/Front Loader	125	Diesel	2		128	8	
Auger Truck	210	Diesel	2		128	8	1.5 LSTs/Day
Dump Truck	350	Diesel	2		128	8	
Water Truck	300	Diesel	2		128	8	
Concrete Mixer Truck	350	Diesel	6		128	5	
LST Steel Haul (10)				8	96		193 LSTs
1-Ton Truck, 4x4	300	Gas	2		96	2	
Flat Bed Truck/Trailer	400	Diesel	2		96	8	2 LSTs/Day
Rough Terrain Forklift	125	Diesel	2		96	6	
LST Steel Assembly (11)				42	129		193 LSTs

Table 16 Construction Equipment and Workforce Estimates by Activity
Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
3/4-Ton Truck, 4x4	275	Gas	6		129	4	1.5 LSTs/Day
1-Ton Truck, 4x4	300	Gas	6		129	4	
Boom/Crane Truck	350	Diesel	6		129	8	
Compressor Trailer	60	Diesel	6		129	6	
LST Erection (12)				16	97		193 LSTs
3/4-Ton Truck, 4x4	275	Gas	4		97	5	2 LSTs/Day
1-Ton Truck, 4x4	300	Gas	4		97	5	
Compressor Trailer	60	Diesel	2		97	6	
Rough Terrain Crane (L)	275	Diesel	2		97	6	
Install Tubular Steel H-Frame Foundations (13)				7	36		36 H-Frames
1-Ton Truck, 4x4	300	Gas	3		36	2	1 H-Frame/Day
Boom/Crane Truck	350	Diesel	1		36	5	
Backhoe/Front Loader	125	Diesel	1		36	8	
Auger Truck	210	Diesel	1		36	8	

Table 16 Construction Equipment and Workforce Estimates by Activity
Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Dump Truck	350	Diesel	1		36	8	
Water Truck	300	Diesel	1		36	8	
Concrete Mixer Truck	350	Diesel	3		36	4	
Tubular Steel H-Frame Haul (14)				4	18		36 H-Frames
3/4-Ton Truck, 4x4	275	Gas	2		18	5	
Flat Bed Truck/Trailer	400	Diesel	2		18	8	2 H-Frames/Day
Boom/Crane Truck	350	Diesel	1		18	6	
Tubular Steel H-Frame Assembly (15)				8	36		36 H-Frames
3/4-Ton Truck, 4x4	275	Gas	2		36	5	
1-Ton Truck, 4x4	300	Gas	2		36	5	
Compressor Trailer	60	Diesel	1		36	5	1 H-Frame/Day
Boom/Crane Truck	350	Diesel	1		36	6	
Tubular Steel H-Frame Erection (16)				8	36		36 H-Frames
3/4-Ton Truck, 4x4	275	Gas	2		36	5	
1-Ton Truck, 4x4	300	Gas	2		36	5	1 H-Frame/Day
Compressor Trailer	60	Diesel	1		36	5	

Table 16 Construction Equipment and Workforce Estimates by Activity Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Rough Terrain Crane (L)	275	Diesel	1		36	6	
Install Conductor & OPGW (17)				32	205		71 Conductor Miles & 35 Miles OPGW
1-Ton Truck, 4x4	300	Gas	4		205	8	0.35 miles/day
Wire Truck/Trailer	350	Diesel	6		205	2	
Dump Truck (Trash)	350	Diesel	1		205	2	
3/4-Ton Truck, 4x4	275	Gas	4		205	8	
Boom/Crane Truck	350	Diesel	1		205	8	
Manlift/Bucket Truck	250	Diesel	4		205	6	
Splicing Rig	300	Diesel	2		205	2	
Spacing Cart	10	Diesel	2		48	2	
Rough Terrain Crane (M)	215	Diesel	1		205	2	
Backhoe/Front Loader	125	Diesel	1		205	2	
Static Truck/ Tensioner	350	Diesel	1		205	2	

Table 16 Construction Equipment and Workforce Estimates by Activity Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Sock Line Puller	300	Diesel	2		205	4	
Bull Wheel Puller	350	Diesel	1		205	3	
Sag Cat w/ winches	350	Diesel	4		205	2	
D8 Cat	350	Diesel	2		205	1	
Hughes 500 E Helicopter		Jet A	1		205	8	
Fuel, Helicopter Support Truck	300	Diesel	1		205	4	
Lowboy Truck/Trailer	450	Diesel	1		205	2	
Guard Structure Removal (18)				6	4		16 Structures
3/4-Ton Truck, 4x4	275	Gas	2		4	6	
1-Ton Truck, 4x4	300	Gas	1		4	6	
Compressor Trailer	60	Diesel	1		4	6	
Pole Truck/Trailer	400	Diesel	1		4	6	4 Structures/Day
Manlift/Bucket Truck	250	Diesel	1		4	4	
Boom/Crane Truck	350	Diesel	1		4	8	

Table 16 Construction Equipment and Workforce Estimates by Activity Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Restoration (19)				7	36		35.5 Miles
1-Ton Truck, 4x4	300	Gas	2		36	2	1 Mile/Day
Motor Grader	250	Diesel	1		36	6	
Backhoe/Front Loader	125	Diesel	1		36	6	
Drum Type Compactor	100	Diesel	1		36	6	
Water Truck	300	Diesel	1		36	8	
Lowboy Truck/Trailer	450	Diesel	1		36	3	

Table 16 Construction Equipment and Workforce Estimates by Activity
Teardown Single-Circuit 115-kv T/L & Construct Double-Circuit 220-kV T/L

Work Activity				Estimated Workforce	Estimated Schedule (Days)		Activity Production
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity			Duration of Use (Hrs/Day)	Estimated Production Per Day
Crew Size Assumptions: #1 Survey = one 4-man crew #2 Marshalling Yards = one 4-man crew #3 Roads & Landing Work = one 5-man crew #4 Guard Structure Installation = one 6-man crew #5 Remove Existing Conductor & OHGW = one 14-man crew #6 Remove Existing LSTs & LSH-Frames = one 6-man crew #7 Remove Existing Foundations = two 4-man crews #8 Remove Existing Wood Poles = one 6-man crew #9 Install Foundations for LSTs = two 9-man crews #10 LST Steel Haul = two 4-man crews #11 LST Steel Assembly = six 7-man crews #12 LST Erection = two 8-man crews #13 Install Foundations for Tubular Steel H-Frames = one 7-man crew #14 Tubular Steel H-Frame Haul = one 4-man crew #15 Tubular Steel H-Frame Assembly = one 8-man crew #16 Tubular Steel H-Frame Erection = one 8-man crew #17 Conductor & OPGW Installation = four 8-man crews #18 Guard Structure Removal = one 6-man crew #19 Restoration = one 7-man crew							

Table 17 Construction Equipment and Workforce Estimate for 8-mile All Dielectric Self Supporting from Ivanpah Substation to Mountain Pass					
Primary Equipment Description	**Estimated Horsepower**	**Probable Fuel Type**	**Primary Equip Quantity**	**Estimated Activity Schedule (Work Days unless otherwise noted)**	**Estimated Equipment Usage Time (Hr Per Day)**
Fiber (Sheaves, Stringing, Dead-ending, Clipping, Dampers, Splicing, underground construction)					
Truck, Flatbed, w/ Bucket, 5 Ton	300	Diesel	1	20	8
Truck, Pick-Up	300	Diesel	1	30	4
Truck, Pick-Up (Edison Carrier Solutions)	300	Gas	1	20	4
Back Hoe, w/ Bucket	150	Diesel	1	3	8
Compressor	50	Gas	1	2	6
Tesla cable stringing Truck (Edison Carrier Solutions [ECS])	300	Diesel	2	35	8
Splicing Van (ECS)	300	Diesel	1	7	8
TOTALS				**117**	**46**

Table 18 Construction Equipment and Workforce Estimates by Activity for Distribution Circuit for Station Light and Power							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Trenching, Structure Excavation(1)				4	14		
1-Ton Crew Cab	300	Diesel	1		14	2	
Backhoe Front Loader	300	Diesel	1		14	8	
Dump Truck	300	Diesel	1			4	
Overhead Line Work(2)				6	24		
1-Ton Crew Cab, 4x4	300	Diesel	1			2	
55' Double Bucket Truck	350	Diesel	1			7	
60' Digger Derrick	350	Diesel	1			4	
Underground Cable Pulling (3)& Transformer Installation				4	6		
55' Double Bucket Truck	350	Diesel	1			7	
1-Ton Crew Cab, 4x4	300	Diesel	1			2	
Hydraulic Rewind Puller	300	Diesel	1			6	
Underground Cable Makeup (4)				3	2		
1- Ton Crew Cab, 4x4	300	Diesel	1			2	
55' Double Bucket Truck	350	Diesel	1			4	
Pole Installation (5)				6	8		
1-Ton Crew Cab, 4x4	300	Diesel	2			2	

Table 18 Construction Equipment and Workforce Estimates by Activity for Distribution Circuit for Station Light and Power							
Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**			**Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
55' Double Bucket Truck	350	Diesel	1			7	
60' Digger Derrick	350	Diesel	1			4	
Crew Size Assumptions: #1 Trenching and Conduit Installation = one 4-man crew #2 Overhead Line Work = one 3-man crew #3 Underground Cable Pulling = one 4-man crew #4 Underground Cable Makeup = one 3-man crew #5 Pole replacement crew = one 4-man crew							

5.16 SAFETY The transmission line will be designed to meet or exceed the requirements of GO 95, Strength Grade A. These strength grades are the highest grades of construction in the respective codes. These codes are designed to protect the safety of the public by requiring the facilities to be designed with adequate strength to prevent or minimize failures, and to provide safety through separation, either vertical or horizontal, between the energized portion of the facilities and the public as they conduct their normal day-to-day activities in the vicinity of the transmission line.

5.16.1 Guard Structures

Guard structures are temporary facilities that protect underlying areas during conductor stringing and conductor removal operations. They are designed to help stop the movement of a conductor if it falls during installation. Typical guard structures are 60- to 80-foot-tall wooden poles, which are buried 6 to 8 feet into the ground. The number of guard poles installed on either side of a crossing varies between two and four, depending on the width of the conductor being installed. Temporary nets also could be installed to protect some structures located under the transmission lines. Guard structures are usually removed once a conductor is installed.

For major roadway and utility crossings, one of the following four methods is typically employed to protect the public:

- Erection of a highway net guard structure system or guard pole structures.
- Detour of all traffic off a highway at the crossing position.
- Implementation of a controlled continuous traffic break, while stringing operations are performed.
- Strategic placement of special line trucks with extension booms on the highway deck.

No BLM route closures are currently proposed for this project; however, field conditions and/or public safety may require a temporary closure. In the event a temporary closure is needed, SCE and the construction contractor will coordinate with the BLM to determine the appropriate time and duration of route closure.

Based on the number of road crossings that will be needed along the project route, SCE has estimated that approximately 16 guard structures (Table 19) will be necessary. The exact number and type of guard structures will be field-verified upon completion of final design. A permit for guard structures will be required for the I-15 crossing. A permit application with complete guard structure plans will be submitted to Caltrans and the California Highway Patrol for their review; however, Caltrans will establish the requirements which will be incorporated in the permit.

Table 19 Guard Structure Locations

GS #	Location of Guard Structure	Type of Guard Structure
1	West-side distribution line between MP 32 and 33	H-Frame

Table 19 Guard Structure Locations		
GS #	**Location of Guard Structure**	**Type of Guard Structure**
2	East-side distribution line between MP 32 and 33	H-Frame
3	South side of dirt road near MP 33	Bucket truck
4	North side of dirt road, near MP 33, crossing over distribution line	Bucket truck
5	Southbound I-15, west side of highway, near MP 29, south of state line	H-Frame w/net Bucket Truck*
6	Southbound I-15 in center median, near MP 29, south of state line	H-Frame w/net Bucket Truck*
7	Northbound I-15 in center median, near MP 29, south of state line	H-Frame w/net Bucket Truck*
8	Northbound I-15 east side of highway, near MP 29, south of state line	H-Frame w/net/Bucket Truck*
9	Southwest side of Lotto Store Road, between MP 28 and 29, at southern edge of outlet mall	H-Frame/Bucket Truck
10	Northeast side of Lotto Store Road, between MP 28 and 29, at southern edge of outlet mall	H-Frame/Bucket Truck
11	Southwest side of Fashion Outlet Way, between MP 28 and 29, at eastern edge of outlet mall	H-Frame/Bucket Truck
12	Northeast side of Fashion Outlet Way, between MP 28 and 29, at eastern edge of outlet mall	H-Frame/Bucket Truck
13	South side of E. Primm Boulevard, between MP 28 and 29	H-Frame/Bucket Truck
14	North side of E. Primm Boulevard, between MP 28 and 29	H-Frame/Bucket Truck
15	West side of Union Pacific Railroad, between MP 26 and 27	H-Frame/Bucket Truck
16	East side of Union Pacific Railroad, between MP 26 and 27	H-Frame/Bucket Truck
Key: GS = Guard Structure; MP = Mile Post * As required		

5.16.2 Grounding

Grounding is a general industrial safety procedure implemented for construction of electric facilities. It entails connecting to the ground all equipment, conductors, anchors, and structures within a defined work area. It can also be accomplished by fully insulating equipment and operators, and by isolating equipment and personnel (Grigsby 2007).

Grounding techniques for electric transmission facilities and equipment depend on the ability of materials to oppose the electric current flow, also known as electrical resistance. Soil resistivity and the foundation-to-ground resistance are basic criteria commonly used for grounding electrical facilities and equipment. In particular, SCE will consider a foundation-to-ground resistance criterion (with dry soil conditions) of 30 ohms or less to be safe, for transmission structures that are located more than 700 feet from a substation. If this condition cannot be met with ground rods, SCE will install special counterpoise systems at the structure footings to reduce the resistance to safe levels. Those structures within the Ivanpah Substation boundary will be grounded to the substation ground grid.

5.17 HAZARDOUS MATERIALS WITHIN CORRIDOR

The construction contractor will prepare a SWPPP and Hazardous Materials Management Plan prior to construction of the project. These plans will address handling of industrial materials, including toxic waste and substances. A hazardous materials management plan guideline document and SWPPP framework are included in Appendix A.

Petroleum products such as gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents will be present within the transmission line corridor during construction. These products will be used to fuel, lubricate, and clean vehicles and equipment, and will be transported in containerized trucks or in other approved containers. When not in use, hazardous materials will be properly stored to prevent drainage or accidents. These materials will not be drained onto the ground or into drainage areas.

Totally enclosed containment shall be provided for all hazardous waste. All construction waste, including trash and litter, garbage, other solid wastes, petroleum products, and other potentially hazardous materials, will be removed to a disposal facility authorized to accept such materials.

6.0 HELICOPTER OPERATIONS

6.1 OPGW INSTALLATION ON THE 500-KV ELDORADO-LUGO TRANSMISSION LINE

This work will require the Eldorado/Lugo 500-kV circuit to have an outage or be de-energized. The scheduled outage for this circuit will start on approximately March 1, 2012, and will end approximately to April 15, 2012, which is a 6-week window to complete the installation of the 25 miles of OPGW. This work will be supported by helicopter(s), possibly by a Hughes 500 Helicopter. The Hughes 500 Helicopter will require a landing area of approximately 50 feet by 50 feet. It must have the capability to land on already disturbed land on the existing right-of-way roads including all spur roads that transverse from the access road and go to each 500-kV tower structure along this 25-mile corridor.

In order for the helicopter to support this project, it must be able to be refueled at any landing location identified along the 25-mile right-of-way. The Jet-A fuel is usually transferred from a support truck that has an auxiliary fuel tank that holds a limited amount of jet fuel. It is dispensed by a hose and fuel nozzle similar to that found at a gas station. The support fuel truck will be supplied with a fire extinguisher, shovel and spill kit.

Helicopter(s) will be used to transport lineman and material to the top of the bridge of each 500-kV tower structure. This will greatly eliminate the need for man lift equipment and construction support equipment to access every tower structure location along the 25-mile right-of-way.

6.2 REMOVAL OF THE 115-KV TRANSMISSION LINE & CONSTRUCTION OF THE BUNDLED DOUBLE CIRCUIT 220-KV TRANSMISSION LINE

The construction of high voltage transmission tower lines relies increasingly on helicopters. Helicopter support has proven to be cost effective, environmentally friendly and safe, and can lower construction costs. The project will be using helicopter(s) throughout all of the construction process. The type of helicopter used for these activities will be a small ship on the order of a Hughes 500. This size of helicopter requires approximately a 50-foot by 50-foot-landing area. The landing area does not have to be perfectly flat or cleared of low lying vegetation. The landing skids on this type of helicopter are approximately 15 feet to 18 feet long and are approximately 4 inches in diameter, which leaves a very small "foot print".

1. Helicopters will be used to pull-in the rope line and install it into the rollers at each tower location.
2. Helicopters will be used to transport linemen/personnel form one tower structure to the other or from one work location to the other work location.
3. Helicopters will be used to deliver material and tools to the lineman located on the tower.

Project scope of work will require the removal of approximately 35 miles of existing 115-kV lattice tower line. The construction of 35 miles of double circuit 220-kV tower line will connect the Ivanpah Substation to Eldorado Substation. The new 220-kV tower line will be located mostly on the same right-of-way that the 115-kV tower line currently occupies.

In order for the support from helicopters during the construction phase of the 220-kV tower line to be effective it will be necessary for the helicopter to be able to land on existing right-of-way roads that parallel the tower line and other pre-disturbed areas located in the construction corridor. Before the helicopter lands on the right-of-way, the landing area will be watered down to suppress dust. The helicopter will need to land on the right-of-way or other approved area in order to pick up linemen and deliver them to the tower site or to the tower structure itself. The linemen will be transported while standing on the helicopter skid and will be secured to the helicopter by safety belts or safety harnesses. The helicopter will also need to be able to land on the right-of-way and other locations along the construction corridor for refueling. This type of small helicopter does not have a large fuel tank plus the added weight of the fuel limits what the helicopter can safely lift and transport. It will not be practical for the helicopter to fly to an established airport or material yard each time it requires fuel.

To transport materials and tools, the helicopter will not always need to land. They will hover approximately 30 to 50 feet above the ground with a "long line" that will be attached to the undercarriage of the helicopter; this line will have a hook on the other end that material/tools will be attached to.

6.3 MICROPILE FOUNDATION INSTALLATION AND TOWER ERECTION

Because of the extreme locations for several towers located in the McCullough Pass, the foundations for these tower structures could be Micropile foundations. If conventional foundations were used at these extreme locations, these tower sites would require extensive road construction and ground disturbance to gain access to the tower site by heavy equipment. However, Micropile tower foundations could be used in place of the conventional-type tower foundation thus eliminating the need to build an access road to the tower site. Conventional-type foundations are located in areas where a large drilling rig including a crane can access the tower location, dig the foundation holes and erect the tower. Several tower sites located in the McCullough Pass have been identified as "likely" sites to use Micropile-type foundations. All the drilling equipment used to support Micropile foundations can be airlifted by a mid-size helicopter like a Kamax (type of helicopter) with lifting capabilities of approximately 5,000 to 6,000 pounds. The equipment required to support Micropile foundations will be staged at the McCullough Material Yard or Cross Roads Material Yard and flown to the tower site located in the McCullough Pass area.

If Micropile foundations are used at these selected sites located in the McCullough Pass, helicopters would also be required to erect the towers in sections since there would be no access road for the tower to be erected by a crane. Tower sections will be assembled at the McCullough Material Yard or they could be assembled at adjacent tower sites and then flown to the Micropile tower site to be erected.

7.0 ENVIRONMENTAL MITIGATION

7.1 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Applicant proposed measures (APMs) and mitigation measures (MMs) that shall be implemented to lessen potential environmental impacts over the entire area crossed by the project have been identified in the Proponents Environmental Assessment (PEA) and FEIR/FEIS. The following MMs will apply to the project and shall be implemented to avoid or reduce resource impacts.

Some of these MMs will be applied to specific areas where needed (i.e., where a specific type of resource exists). Locations where geographically specific measures will be applied are described below.

In addition, SCE is developing both a company-wide Avian Protection Plan and a project-specific Avian Monitoring and Mitigation Plan to ensure adequate protection and mitigation of avian species per BLM requirements and standards. The Avian Protection Plan will be provided once completed.

7.1.1 Biological Resources

Applicant Proposed Measures

APM BIO-1: Preconstruction Surveys

Preconstruction biological clearance surveys will be conducted to identify special-status plants and wildlife.

APM BIO-2: Minimize Vegetation Impacts

Every effort will be made to minimize vegetation removal and permanent loss at construction sites. If necessary, native vegetation will be flagged for avoidance.

APM BIO-3: Avoid Impacts to State and Federal Jurisdiction Wetlands

Construction crews will avoid impacting the streambeds and banks of streams along the route to the extent possible. As applicable, the necessary permits would be obtained from the appropriate agencies. Impacts will be mitigated based on the terms of the permits. No streams with flowing waters capable of supporting special status species will be expected to be impacted by the project.

APM BIO-4: Best Management Practices

Crews will be directed to use Best Management Practices (BMP) where applicable. These measures will be identified prior to construction and incorporated into the construction operations.

APM BIO-5: Biological Monitors

Biological monitors will be assigned to the project in areas of sensitive biological resource. The monitors will be responsible for ensuring that impacts to special-status species, native vegetation, wildlife habitat, or unique resources will be avoided to the fullest extent possible. Where appropriate, monitors will flag the boundaries of areas where activities need to be restricted in order to protect native plants and wildlife or special-status species. Those restricted areas will be monitored to ensure their protection during construction.

APM BIO-6: Worker Environmental Awareness Program

A Worker Environmental Awareness Program (WEAP) will be prepared. All construction crews and contractors will be required to participate in WEAP training prior to starting work on the project. The WEAP training will include a review of the special-status species and other sensitive resources that could exist in the project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel will be maintained.

APM BIO-7: Avoid Impacts to Active Nests

SCE will conduct project-wide raptor and nesting bird surveys and remove trees or other vegetation, if necessary, outside of the nesting season (nesting season in the project area is late February to early July). If vegetation or existing structures containing a raptor nest or other active nest must be removed during nesting season, or if work is scheduled to take place in close proximity to an active nest on an existing transmission or subtransmission tower or pole, SCE will coordinate with the USFWS, CDFG, and/or the Nevada Department of Wildlife (NDOW) as appropriate to obtain written verification prior to moving the nest.

APM BIO-8: Avian Protection

All transmission and subtransmission towers and poles will be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee 2006).

APM BIO-9: Facility Siting

Final tower and spur road locations will be adjusted to avoid sensitive biological resources to the greatest extent feasible.

APM BIO-10: Invasive Plant Management

An Invasive Plant Management Plan will be developed to reduce the potential for spreading invasive plant species during construction activities.

APM BIO-11: Desert Tortoise Measures

The applicant or a qualified consultant would provide for the following to reduce impacts on Desert Tortoise:

- A field contact representative would be designated and would oversee compliance monitoring activities and coordination with the authorizing agency or agencies. Compliance activities would at a minimum include conducting preconstruction surveys, ensuring proper removal of Desert Tortoise, staffing biological monitors on construction spreads, and upholding all conditions authorized. The field contact representative would also oversee all compliance documentation, including daily observation reports, non-compliance and corrective action reports, and final reporting to any authorized agency upon project completion.
- All work area boundaries associated with temporary and permanent disturbances would be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers would strictly limit activities and vehicles to the designated work areas.
- Crushing/removal of perennial vegetation in work areas would be avoided to the maximum extent practicable.
- All trash and food items generated by construction and maintenance activities would be promptly contained and regularly removed from the project site(s) to reduce the attractiveness of the area to common ravens.
- Pets would not be allowed in working areas unless restrained in a kennel.
- Where possible, motor vehicles would be limited to maintained roads and designated routes.
- Vehicle speed within the project area, along right-of-way maintenance routes, and along existing access roads would not exceed 20 miles per hour. Speed limits would be clearly marked and all workers would be made aware of these limits.
- Constructed road berms, when practical, would be less than 12 inches in height and have slopes of less than 30 degrees.
- Construction monitoring would employ a designated field contact representative, authorized biologist(s), and qualified biologist(s) approved by the BLM during the construction phase. At a minimum, qualified biologist(s) would be present during all activities in which encounters with tortoises could occur. A qualified biologist is defined as a person with appropriate education, training, and experience to conduct tortoise surveys, monitor project activities, provide worker education programs, and supervise or perform other implementing actions. An authorized biologist is defined as a wildlife biologist who has been authorized to handle Desert Tortoises by the USFWS. A field contact representative is defined as a person designated by the project proponent who is responsible for overseeing compliance with Desert Tortoise protective measures and for coordination with agency compliance officer(s).
- Preconstruction clearance surveys would be conducted within 48 hours of initiation of site-specific project activities, following USFWS protocol (USFWS 1992). The goal of a

clearance survey is to find all tortoises on the surface and in burrows that could be harmed by construction activities. Surveys would cover 100 percent of the acreage to be disturbed. All potential tortoise burrows within 100 feet of construction activity would be marked. Tortoise burrows would be avoided to the extent practicable, but would be excavated, once the burrow is found unoccupied they would be crushed by construction activities.

- Any tortoise found on the surface would be relocated to less than 1,000 feet away. Tortoises would be handled carefully following the guidelines given in *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999). Tortoises would be handled with new latex gloves each time to avoid transmission of disease, and handlers would especially note guidelines for precautions to be taken during high-temperature periods.
- If a potential tortoise burrow were required to be excavated, the biologist would proceed according to the guidelines given in *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999). Tortoises removed from burrows would be relocated to an artificial burrow, and the entrance of the artificial burrow would be blocked until construction activities in the area were over.
- For activities conducted between March 15 and November 1 in Desert Tortoise habitat, all activities in which encounters with tortoises might occur would be monitored by a qualified or authorized biologist. The biologist would be informed of tortoises relocated during preconstruction surveys so that he or she could watch for the relocated tortoises in case they attempted to return to the construction site. The qualified or authorized biologist would watch for tortoises wandering into the construction areas, check under vehicles, examine excavations and other potential pitfalls for entrapped animals, examine exclusion fencing, and conduct other activities to ensure that death or injuries of tortoises were minimized.
- No overnight hazards to Desert Tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) would be left unfenced or uncovered; such hazards would be eliminated each day prior to the work crew and biologist leaving the site. Large or long-term project areas would be enclosed with tortoise-proof fencing. Fencing would be removed when restoration of the site was completed.
- Any incident occurring during project activities that was considered by the biological monitor to be in non-compliance with the mitigation plan would be documented immediately by the biological monitor and then the construction manager would be contacted so that the. appropriate corrective action was taken. Corrective actions would be documented by the monitor. The following incidents would require immediate cessation of the construction activities causing the incident, including (1) imminent threat of injury or death to a Desert Tortoise; (2) unauthorized handling of a Desert Tortoise, regardless of intent; (3) operation of construction equipment or vehicles outside a project area cleared of Desert Tortoise, except on designated roads; and (4) conducting any construction activity without a biological monitor where one was required. If the monitor and field contact representative did not agree, the federal agency's compliance officer would be contacted for resolution. All parties could refer the resolution to the federal agency's authorized officer.

- All construction personnel, including subcontractors, would complete a WEAP. This instruction would include specific Desert Tortoise training on distribution, general behavior and ecology, identification, protection measures, reporting requirements, and protections afforded by state and federal endangered species acts.
- Parked vehicles would be inspected prior to being moved. If a tortoise were found beneath a vehicle, the authorized biologist would be contacted to move the animal from harm's way, or the vehicle would not be moved until the Desert Tortoise left of its own accord. The authorized biologist would be responsible for taking appropriate measures to ensure that any Desert Tortoise moved in this manner was not be exposed to temperature extremes that could be harmful to the animal.
- Should any Desert Tortoise be injured or killed, all construction activities would be halted, and the field contact representative and/or authorized biologist immediately contacted. The field contact representative and/or authorized biologist would be responsible for reporting the incident to the authorizing agencies.
- A report to the USFWS would be produced reporting all tortoises seen, injured, killed, excavated, or handled. GPS locations of live tortoises would be reported.
- The applicant would implement a Raven Management Program that would consist of: (1) an annual survey to identify raven nests on towers, and any tortoise remains at tower locations; this information would be relayed to the BLM so that the ravens and/or their nests in these towers could be targeted for removal and (2) SCE making an annual or one-time contribution to an overall raven reduction program in the California or Nevada desert, with an emphasis on raven removal in the vicinity of this project.

APM BIO-12: Desert Bighorn Sheep Measures

The applicant would consult with the BLM, USFWS, and NDOW regarding conservation measures to avoid impacts on Desert Bighorn Sheep during construction. Project areas with the potential to impact Bighorn Sheep include the proposed transmission line route through the McCullough Range and the telecommunication route segment in the southern Eldorado Valley between the Highland Range and the Southern McCullough Range. Avoidance and minimization measures could include such elements as preconstruction surveys, biological monitoring, and timing construction activities to avoid Bighorn Sheep active seasons. Construction requiring the use of helicopters would be conducted outside of bighorn lambing season (April through October) and the dry summer months when bighorn may need to access artificial water sources north of the proposed route in the McCullough Range (June through September).

APM BIO-13: Western Burrowing Owl Measures

Where project ground-disturbing activities would occur prior to the Burrowing Owl breeding season (mid-March to August), all burrows, holes, crevices, or other cavities in suitable habitat on the project, within the limits of proposed ground disturbance, would be thoroughly inspected by a qualified biologist before being collapsed. This would discourage owls from breeding on the construction site. Other species using burrows would be relocated prior to collapsing burrows. If construction were to be initiated after the commencement of the breeding season and Burrowing

Owls could be seen within areas to be affected by ground construction activities, a qualified biologist would observe behavior to determine their breeding status. If breeding were observed, the nest area would be avoided, with an appropriately sized buffer sufficient to prevent disturbance during construction activities until the chicks fledged.

APM BIO-14: Gila Monster and Chuckwalla Measures

The following measures are the current NDOW construction site protocols for the Gila Monster (NDOW 2005). These protocols are applicable for the Gila Monster in both the Nevada and California sections of the project, and applicable for the Chuckwalla in the Nevada section of the project.

Through the WEAP, workers and other project personnel should (at a minimum) know how to (1) identify Gila Monsters and distinguish them from other lizards, such as Chuckwallas and banded geckos; (2) report any observations of Gila Monsters (in Nevada) to the biological monitor for notification of the NDOW; (3) be alerted to the consequences of a bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.

- Live Gila Monsters found in harm's way on the construction site would be captured by the project biologist or equivalent personnel and then detained in a cool, shaded environment (<85 degrees Fahrenheit) until an NDOW biologist could arrive for documentation purposes. Although a Gila Monster is venomous and can deliver a serious bite, its relatively slow gait allows for it to be easily coaxed or lifted into an open bucket or box, carefully using a long handled instrument such as a shovel or snake hook (note: it is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points). A clean 5-gallon plastic bucket with a secure, vented lid; an 18-inch x 18-inch x 4-inch plastic sweater box with a secure, vented lid; or a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location (e.g., GPS record), date, time, and circumstances (e.g., biological survey or construction) and habitat description (vegetation, slope, aspect, and substrate) would also be provided to NDOW.
- Injuries to Gila Monsters may occur during excavation, blasting, road grading, or other construction activities. If a Gila Monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses would not be covered by NDOW. However, NDOW would be immediately notified during normal business hours. If an animal were killed or found dead, the carcass would be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, habitat, and mapped location.
- Should NDOW's assistance be delayed, biologists or equivalent acting personnel on-site may be requested to remove and release the Gila Monster out of harm's way. Should NDOW not be immediately available to respond for photo-documentation, a 35-mm camera or equivalent (5-megapixel digital minimum preferred) would be used to take good quality images of the Gila Monster in situ at the location of live encounter or dead

salvage. The pictures, preferably on slide film (.tif or .jpg digital format), would be provided to NDOW. Pictures would include the following information: (1) encounter location (landscape with Gila Monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila Monster should fill camera's field of view and be in sharp focus); (3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

Mitigation Measures

MM BIO-1: Preconstruction Surveys

Preconstruction surveys will be conducted by USFWS-approved biologists according to the most current USFWS protocols, where available by species. These surveys will include surveying brush clearing areas and ground-disturbance areas within habitat deemed suitable for sensitive species by a qualified biologist. As part of the preconstruction surveys, the composition of the vegetation community will be surveyed to establish baseline conditions prior to construction for post-construction restoration efforts. These surveys will be conducted for the presence of special-status plants, the presence of noxious weeds, and the presence of general and special-status wildlife species, to prevent direct loss of vegetation and wildlife and to prevent the spread of noxious plant species. For the noxious weeds survey, the level of effort and extent of the surveys will be outlined by the Invasive Plant Management Plan (MM BIO-4).

MM BIO-2: Reclamation Plan

The applicant will develop a RRRP prior to adoption of the Final EIR/EIS that will guide restoration and revegetation activities for all disturbed lands associated with construction of the project and the eventual termination and decommissioning of the project. The RRRP will be part of the applicant's final POD for the project and should address all federal and private land disturbances. The RRRP will be developed in consultation with appropriate agencies (BLM, CPUC) and be provided to these agencies for review prior to preparation of the Final EIR/EIS. The RRRP will also provide details including (but not limited to) topsoil segregation and conservation; vegetation treatment and removal; salvage of succulent species; revegetation methods, including seed mixes, rates and transplants; and criteria to monitor and evaluate revegetation success. Post-construction monitoring will be performed for 1 to 5 years, depending on the disturbance level and restoration level as outlined in the BLM 2001 *Restoration Plan for Energy Projects in the Las Vegas Field Office.*

MM BIO-3: Special-Status Plants Restoration and Compensation

The applicant will mitigate for the loss of special-status plant species within the project area following the completion of all construction activities at a site. This must occur within 1 year of post-construction, according to the requirements of resource agency authorizations (e.g., CDFG 2081 permit). Special-status plants will be restored by relocation of plants and/or re-seeding, replacing topsoil with existing topsoil that was removed, and re-grading to pre-existing soil contours. Measures to restore special-status plants will be implemented through the Reclamation Plan (MM BIO-2). Additionally, that plan will provide a matrix showing how the applicant will

address each species considered sensitive or special-status in terms of mitigation type (e.g., seed collection, transplanting, fencing certain population, and compensation measures). The CDFG will likely require land compensation and enhancement and endowment fees for the project, in addition to restoration. If special-status plant communities cannot be restored, the applicant will provide compensation if required, in consultation with appropriate agencies (USFWS, BLM, CDFG, NDOW, and CPUC). In order to ensure enforceability, documentation of consultations with all appropriate agencies will be provided to the CPUC (the CEQA [California Environmental Quality Act] lead agency).

MM BIO-4: Model Invasive Plant Management Plan on the BLM Las Vegas Office Draft Weed Plan

The Invasive Plant Management Plan to be developed (APM BIO-10) will be modeled on the BLM Las Vegas Office Draft Weed Plan. The plan will include operation and maintenance activities, as well as construction activities. The content of the plan will include results of the noxious weed inventory, identification of problem areas, preventative measures, treatment methods, agency-specific requirements, monitoring requirements, and herbicide treatment protocol. The plan will be submitted to both the California and the Nevada resource agencies and to the CPUC for approval prior to construction authorization.

MM BIO-5: Jurisdictional Delineation

SCE will conduct a formal jurisdictional delineation within the boundaries of the project area once final engineering for the location of project-specific features is complete. This will be done prior to construction and is required in order to apply for permits, if needed, with U.S. Army Corps of Engineers (USACE), California Regional Water Quality Control Board, and CDFG. A copy of the jurisdictional delineation will be provided to the CPUC.

MM BIO-6: Drainage Crossings Design

If drainages cannot be avoided by infrastructure placement, then the applicant will design drainage crossings to accommodate estimated peak flows and ensure that natural volume capacity can be maintained throughout construction and upon post-construction restoration. This measure is necessary to minimize the amount of erosion and degradation to which drainages are subject.

MM BIO-7: Mitigation Monitoring Plan for Affected Jurisdictional Areas

The applicant will develop a Mitigation Monitoring Plan for affected jurisdictional areas within established riparian areas, as needed, for submittal to the USACE for review and approval. The plan will outline measures to accomplish restoration, provide criteria for restoration success, and/or provide compensation ratios. This measure is needed to compensate for loss of wetlands and waters that provide suitable habitat for special-status and sensitive species, and provide important hydrological and water quality functions in the desert environment. Monitoring and reporting, likely for up to 3 to 5 years post-construction, will be required pending consultation

with agencies. A copy of the approved Mitigation Monitoring Plan will be provided to the CPUC.

MM BIO-8: Reduce Night Lighting

Night lighting will be reduced in all natural areas to avoid unnecessary visual disturbance to wildlife. Night lighting during construction, operations, and maintenance will be reduced in natural areas using directed lighting, shielding methods, and/or reduced lumen intensity. The applicant will indicate anticipated measures to resource agencies for approval prior to construction. The approved measures will be provided to the CPUC.

MM BIO-9: Cover Steep-walled Trenches or Excavations during Construction

To prevent entrapment of wildlife, all steep-walled trenches, auger holes, or other excavations will be covered at the end of each day. Fencing will be maintained around the covered excavations at night. For open trenches, earthen escape ramps will be maintained at intervals of no greater than 0.25 mile. A biological monitor will inspect all trenches, auger holes, or other excavations a minimum of twice per day, and also immediately prior to back-filling. Any wildlife species found will be safely removed and relocated out of harm's way, using a suitable tool such as a pool net when applicable. For safety reasons, biological monitors will under no circumstance enter open excavations.

MM BIO-10: Biological Monitors

Biological monitors will be provided throughout construction activities in all construction zones with the potential for presence of sensitive biological resources. A minimum of one monitor per crew is needed for construction crews using heavy equipment (e.g., backhoes, large trucks). One roving monitor will monitor multiple times per day in other active construction zones where heavy equipment is not in use.

MM BIO-11: Water Usage

Water used for fugitive dust control will not be allowed to pool on access roads or other project areas, as this can attract Desert Tortoises. Similarly, water trucks and water tanks would be inspected for leaks and leaks would be repaired to prevent pooling water.

MM BIO-12: Desert Tortoise Impacts Reduction Measures

To reduce impacts on Desert Tortoise, the following will be done:

- The applicant cannot begin construction until issuance and acceptance of the USFWS Biological Opinion, the CDFG 2081 permit, and NDOW authorization. Additionally, compliance discussions with Clark County and Boulder City that resolve and outline the specific compensation fees or additional mitigation measures needed for loss of Desert Tortoise habitat must occur prior to construction. A copy of the USFWS Biological

Opinion and documentation of any compliance discussions with Clark County and Boulder City will be provided to the CPUC.

- Construction monitoring will employ a designated field contact representative, authorized biologist(s), and qualified biologist(s) approved by the USFWS, NDOW, and CDFG during the construction phase of the project.
- Qualified and/or authorized biologists will monitor all construction activities year-round in Desert Tortoise habitat, regardless of the time of year or weather conditions, as tortoises are often active outside their "active" season.
- Authorized biologists will conduct preconstruction surveys according to the most current USFWS protocol.
- Qualified and/or authorized biologists will handle Desert Tortoises following the most current Desert Tortoise Council handling guidelines (2009 or newer).
- Prior to commencing Desert Tortoise relocation activities, authorization will be obtained from NDOW, CDFG, and USFWS. The authorized biologist will not be required to receive approval to move individual Desert Tortoises during construction.
- Biological monitors will clear ahead of construction crews in Desert Tortoise habitat during all clearing and grading activities, or during any activity where undisturbed vegetation would be crushed. In addition, biological monitors will clear ahead of larger, non-rubber-tired equipment when that equipment is being driven on access and spur roads.
- Biological monitors will clear all active work sites located in Desert Tortoise habitat each morning, before construction begins and throughout the day if crews move from construction site to construction site.
- Results of biological monitoring and status of construction will be detailed in daily reports by biological monitors. These reports will be submitted to the authorized biologist on a daily basis and to the on a weekly basis (at minimum). The authorized biologist will notify the within 24 hours of any action that involves harm to a Desert Tortoise, or involves a blatant disregard by construction personnel for the APM or mitigation measure designed to minimize impacts on Desert Tortoise or other wildlife. The authorized biologist will submit to the USFWS, NDOW, CDFG, and CPUC a summary of all Desert Tortoises seen, injured, killed, excavated, and handled at the end of the project or within 2 working days of when Desert Tortoises are harmed.

For California portions of the project, in addition to adhering to the most current Desert Tortoise Council handling guidelines, the following guidelines will be adhered:

- No Desert Tortoise shall be captured, moved, transported, released, or purposefully caused to leave its burrow for whatever reason when the ambient air temperature is above 95 degrees Fahrenheit (35 degrees Celsius). No Desert Tortoise shall be captured if the ambient air temperature is anticipated to exceed 95 degrees Fahrenheit before handling or processing can be completed. If the ambient air temperature exceeds 95 degrees Fahrenheit during handling or processing, Desert Tortoises shall be kept shaded in an environment which does not exceed 95 degrees Fahrenheit, and the animals shall not be released until the ambient air temperature declines to below 95 degrees Fahrenheit. For

translocation, captured tortoises may be held overnight and moved the following morning within these temperature constraints.

- During all handling procedures, Desert Tortoises must be treated in a manner to ensure that they do not overheat, exhibit signs of overheating (e.g., gaping, foaming at the mouth, hyperactivity, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert Tortoises must be kept shaded at all times until it is safe to release them. Ambient air temperature must be measured in the shade, protected from wind, and at a height of 2 inches above the ground surface.
- If a Desert Tortoise voids its bladder as a result of being handled, the animal shall be rehydrated. The process of rehydrating a Desert Tortoise will take place at the location where the animal was captured (or to be released, for translocated tortoises), and consist of placing the Desert Tortoise in a tub with a clean plastic disposable liner. The amount of water that is placed in the lined tub shall not be higher than the lower jaw of the animal. Each Desert Tortoise shall be rehydrated for a minimum of 10 to 20 minutes. During the period when the Desert Tortoise is in the tub, the tub will be placed in a quiet protected area. Desert Tortoises shall be soaked individually.
- If a Desert Tortoise is injured as a result of project-related activities, it shall be immediately taken to a CDFG-approved wildlife rehabilitation or veterinary facility. The applicant shall identify the facility prior to the start of ground- or vegetation-disturbing activities. The applicant shall bear any costs associated with the care or treatment of such injured species. The applicant shall notify CDFG of the injury immediately, unless the incident occurs outside of normal business hours. In that event CDFG shall be notified no later than noon on the next business day. Notification to CDFG shall be via telephone or email, followed by a written incident report. Notification shall include the date, time, location, and circumstances of the incident, and the name of the facility where the animal was taken.

MM BIO-13: Desert Bighorn Sheep Impacts Reduction Measures

To reduce impacts on Desert Bighorn Sheep, the following will be done:

- Conduct preconstruction survey for Desert Bighorn Sheep within suitable Bighorn Sheep habitat within 1 week prior to construction activities in the McCullough Range and the southern portion of the Eldorado Valley, between the Highland Range and the Southern McCullough Range. The occurrence and location of any Desert Bighorn Sheep will be reported to NDOW.
- Conduct biological monitoring by a qualified biologist for Desert Bighorn Sheep during duration of construction within suitable Bighorn Sheep habitat. The occurrence and location of any Desert Bighorn Sheep will be reported to NDOW. If Bighorn Sheep are found to be within 500 feet of construction activities, construction in that area will be stopped until the sheep vacate that specific project area.
- Avoid all construction activities (with the exception of vehicle use of access roads during emergencies) in lambing areas from January to May in the North McCullough Pass area

(approximately MP 9 to MP 12), during the duration of construction and all maintenance events.

MM BIO-14: American Badger Impacts Reduction Measures

To reduce impacts to American badger, the following will be done:

- Qualified biologists will be notified if badgers are observed within the project area during construction activities. Work will immediately be stopped in the area if the biologists find occupied burrows within 100 feet of construction activities during preconstruction surveys.
- Qualified biologists will ensure passive relocation of the occupied burrow by installing one-way trap doors on the burrow. The burrow will be collapsed after the badger vacates.
- Work will be allowed to resume once the burrow has relocated outside the 100-foot zone.

MM BIO-15: Migratory Birds and Raptors Impacts Reduction Measures

To reduce impacts on migratory birds and raptors, the following will be done:

- Biological monitors will monitor and enforce disturbance buffers around all active bird nests (for raptors and species protected by the Migratory Bird Treaty Act) found in project areas during construction. The general bird breeding season for this area is late February to early July. For raptors, the applicant will use the USFWS Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (1999) to determine appropriate survey areas and disturbance buffers for active nests; for Burrowing Owl nests, the applicant will be in compliance with the minimum distances outlined by the California Burrowing Owl Consortium Protocol. For all non-raptor bird species, biologists will survey within project areas. Because there are no standardized disturbance buffers for active non-raptor bird nests, SCE will consult with the appropriate agencies (BLM, USFWS, CDFG, and NDOW) on a case-by-case basis when active nests are found in project areas, unless directed to do otherwise by these same agencies.
- Active bird nests will not be moved during breeding season, unless the project is expressly permitted to do so by the USFWS, BLM, CDFG, or NDOW, depending on the location of the nest.
- All active nests and disturbance or harm to active nests will be reported within 24 hours to the USFWS, BLM, CDFG, and NDOW, upon detection.
- The biological monitor will halt work in the adjacent area if it is determined that active nests would be disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.
- Seasonal work stoppages may be required by NDOW for project areas that pass the Wee Thump Joshua Tree Wilderness, if construction activities occur within the breeding season. The applicant will consult with NDOW prior to construction.
- As outlined by the *Suggested Practices for Avian Protection on Power Lines* (Avian Power Line Interaction Committee 2006), transmission, subtransmission, and distribution structures will be designated and constructed to be avian safe by ensuring a minimum

phase to phase and phase to ground separation of 60 inches horizontal and 40 inches vertical. This separation will be maintained or energized equipment will be covered to prevent electrocution by perched birds and their wingspan.

MM BIO-16: Burrowing Owl Impacts Reduction Measures

To reduce impacts on Burrowing Owls, the following will be done:

- A qualified biologist will conduct preconstruction surveys within 30 days prior to construction for Burrowing Owls within suitable habitat prior to breeding season (February 1 through August 31). All areas within 50 meters (approximately 150 feet) of the project area will be surveyed.
- To prevent disturbance, if an active nest is identified there will be no construction activities within 50 meters (approximately 150 feet) of the nest location until the chicks have fledged, as determined by a qualified biologist.
- The occurrence and location of any Burrowing Owl will be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. The authorized biologist will report all incidents of disturbance or harm to Burrowing Owls within 24 hours to the appropriate resource agencies (USFWS, BLM, NDOW, CDFG).

If Burrowing Owls are found on site in the California portion of the project, the following additional measures will be included:

- As compensation for the direct loss of Burrowing Owl nesting and foraging habitat, the project proponent shall mitigate by acquiring and permanently protecting known Burrowing Owl nesting and foraging habitat at the following ratio:
  - Replacement of occupied habitat with suitable habitat at 1.5 x 6.5 acres per pair or single bird
  - Replacement of occupied habitat with habitat contiguous with occupied habitat at 2 x 6.5 acres per pair or single bird
  - Replacement of occupied habitat with suitable unoccupied habitat at 3 x 6.5 acres per pair or single bird
- A Burrowing Owl Mitigation and Monitoring Plan shall be submitted to CDFG for review and approval prior to relocation of owls. The Burrowing Owl Mitigation and Monitoring Plan shall describe proposed relocation and monitoring plans. The plan shall include the number and location of occupied burrow sites and details on adjacent or nearby suitable habitat available to owls for relocation. If no suitable habitat is available nearby for relocation, details regarding the creation of artificial burrows (numbers, location, and type of burrows) shall also be included in the plan. The plan will also describe proposed off-site areas to preserve to compensate for impacts to Burrowing Owls/occupied burrows at the project site as required under Condition 1. A copy of the approved plan will be provided to the CPUC.

BIO MIT-1: Desert Tortoise

- A field contact representative will be designated and shall oversee compliance monitoring activities and coordination with the authorizing agency or agencies. Compliance activities shall at a minimum include conducting preconstruction surveys, ensuring proper removal of Desert Tortoise, staffing of biological monitors on construction spreads, and upholding all conditions authorized. The field contact representative shall also oversee all compliance documentation, including daily observation reports, non-compliance and corrective action reports, and final reporting to any authorized agency upon project completion.
- All work area boundaries associated with temporary and permanent disturbances will be conspicuously staked, flagged, or marked to minimize surface disturbance activities. All workers shall strictly limit activities and vehicles to the designated work areas.
- Crushing/removal of perennial vegetation in work areas will be avoided to the maximum extent practicable.
- All trash and food items generated by construction and maintenance activities shall be promptly contained and regularly removed from the project site(s) to reduce the attractiveness of the area to common ravens.
- Pets shall not be allowed in working areas, unless restrained in a containment box.
- Where possible, motor vehicles shall be limited to maintained roads and designated routes.
- Vehicle speed within the project area, along maintenance routes, and existing access roads shall not exceed 20 miles per hour. Speed limits shall be clearly marked and all workers shall be made aware of these limits.
- Construction monitoring will employ a designated field contact representative, authorized biologist(s), and qualified biologist(s) approved by the BLM during the construction phase. At a minimum, qualified biologist(s) shall be present during all activities in which encounters with tortoises may occur. A qualified biologist is defined as a person with appropriate education, training, and experience to conduct tortoise surveys, monitor project activities, provide worker education programs, and supervise or perform other implementing actions. An authorized biologist is defined as a wildlife biologist who has been authorized to handle Desert Tortoises by the Service or CDFG. A field contact representative is defined as a person designated by the project proponent who is responsible for overseeing compliance with Desert Tortoise protective measures and for coordination with agency compliance officer(s).
- Preconstruction clearance surveys will be conducted within 48 hours of initiation of site-specific project activities, following Service protocol (USFWS 1992). The goal of a clearance survey is to find all tortoises on the surface and in burrows that could be harmed by construction activities. Surveys will cover 100 percent of the acreage to be disturbed. All potential tortoise burrows within 100 feet of construction activity will be marked. Tortoise burrows will be avoided to the extent practicable, but will be excavated if they would be crushed by construction activities.

- Any tortoise found on the surface will be relocated to less than 1,000 feet away. Tortoises will be handled carefully following the *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999). Tortoises will be handled with new latex gloves each time to avoid transmission of disease. Note especially the guidelines for precautions to be taken during hot temperatures.
- If a potential tortoise burrow must be excavated, the biologist will proceed according to the *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999). Tortoise removed from burrows will be relocated to an artificial burrow. The entrance of the artificial burrow will be blocked until construction activities in the area are over.
- For activities conducted between March 15 and November 1 in Desert Tortoise habitat, all activities in which encounters with tortoises may occur will be monitored by a qualified or authorized biologist. The qualified or authorized biologist will be informed of tortoises relocated during preconstruction surveys so that they can watch for the relocated tortoises in the event that they attempt to return to the construction site. The qualified or authorized biologist will watch for tortoises wandering into the construction areas, check under vehicles, examine excavations and other potential pitfalls for entrapped animals, examine exclusion fencing, and conduct other activities to ensure that death or injuries of tortoises is minimized.
- No overnight hazards to Desert Tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) shall be left unfenced or uncovered; such hazards shall be eliminated each day prior to the work crew and biologist leaving the site. Large or long-term project areas shall be enclosed with tortoise-proof fencing. Fencing shall be removed when restoration of the site is completed.
- Any incident occurring during project activities that is considered by the biological monitor to be in non-compliance with the mitigation plan shall be documented immediately by the biological monitor. The field contact representative shall ensure that appropriate corrective action is taken. Corrective actions shall be documented by the monitor. The following incidents shall require immediate cessation of the construction activities causing the incident, including (1) imminent threat of injury or death to a Desert Tortoise; (2) unauthorized handling of a Desert Tortoise, regardless of intent; (3) operation of construction equipment or vehicles outside a project area cleared of Desert Tortoise, except on designated roads; and (4) conducting any construction activity without a biological monitor where one is required. If the monitor and field contact representative do not agree, the federal agency's compliance officer shall be contacted for resolution. All parties may refer the resolution to the federal agency's authorized officer.
- All construction personnel, including subcontractors will undergo a WEAP. This instruction shall include specific Desert Tortoise training on distribution, general behavior and ecology, identification, protection measures, reporting requirements, and protections afforded by state and federal endangered species acts.
- Parked vehicles shall be inspected prior to being moved. If a tortoise is found beneath a vehicle, the authorized biologist shall be contacted to move the animal from harm's way, or the vehicle shall not be moved until the Desert Tortoise leaves on its own accord. The authorized biologist shall be responsible for taking appropriate measures to ensure that

any Desert Tortoise moved in this manner is not exposed to temperature extremes that could be harmful to the animal.

- Should any Desert Tortoise be injured or killed, all activities shall be halted and the field contact representative and/or authorized biologist immediately contacted. The field contact representative and/or authorized biologist shall be responsible for reporting the incident to the authorizing agencies.
- A report to the Service will be produced reporting all tortoises seen, injured, killed, excavated, and handled. GPS locations of live tortoises will be reported.
- SCE will implement a Raven Management Program that consists of: (1) an annual survey to identify any tortoise remains at the base of the towers; this information will be relayed to the BLM so that the ravens and/or their nests in these towers can be targeted for removal, and (2) SCE making make an annual or one time contribution to an overall raven reduction program in the California or Nevada desert, with an emphasis on raven removal in the vicinity of this project.

BIO MIT-2 Desert Bighorn Sheep

SCE will consult with the BLM, USFWS, and NDOW regarding conservation measures to avoid impacts to Desert Bighorn Sheep during construction. Project areas with the potential to impact Bighorn include the proposed transmission line route through the McCullough Range and the telecommunication route segment in the southern portion of the Eldorado Valley between the Highland Range and the Southern McCullough Range. Mitigation measures may include such elements as preconstruction surveys, biological monitoring, and timing construction activities to avoid bighorn active seasons. Construction requiring the use of helicopters should be conducted outside of bighorn lambing season (April through October) and the dry summer months when bighorn may need to access artificial water sources north of the proposed route in the McCullough Range (June through September).

BIO MIT-3 Western Burrowing Owl

The Western Burrowing Owl is likely to occur within the California segment of the project. Where project ground disturbing activities will occur prior to the Burrowing Owl breeding season (mid March to August), all burrows, holes, crevices, or other cavities in suitable habitat on the project, within the limits of proposed ground disturbance, will be thoroughly inspected by a qualified biologist before collapsing. This will discourage owls from breeding on the construction site. Other species using burrows will be relocated prior to collapsing burrows. If construction is initiated after the commencement of the breeding season and Burrowing Owls can be seen within areas to be affected by ground construction activities, behavioral observations will be done by a qualified biologist to determine their breeding status. If breeding is observed, the nest area will be avoided with an appropriately sized buffer sufficient to prevent disturbance during construction activities until the chicks fledge.

BIO MIT-4 Gila Monster

The following mitigation measures are the current NDOW construction site protocols for the Gila Monster (NDOW 2005). These protocols are applicable for the Gila Monster in both the Nevada and California sections of the project.

Through the WEAP, workers and other project personnel should (at a minimum) know how to: (1) identify Gila Monsters and be able to distinguish it from other lizards such as Chuckwallas and banded geckos; (2) report any observations of Gila Monsters (in Nevada) to biological monitor for notification of the NDOW; (3) be alerted to the consequences of a bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.

- Live Gila Monsters found in harm's way on the construction site will be captured and then detained in a cool, shaded environment (<85 degrees Fahrenheit) by the project biologist or equivalent personnel until a NDOW biologist can arrive for documentation purposes. Despite the fact that a Gila Monster is venomous and can deliver a serious bite, its relatively slow gait allows for it to be easily coaxed or lifted into an open bucket or box, carefully using a long handled instrument such as a shovel or snake hook (Note: it is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points). A clean 5-gallon plastic bucket with a secure, vented lid; an 18-inch x 18-inch x 4-inch plastic sweater box with a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location (e.g., GPS record), date, time, and circumstances (e.g., biological survey or construction) and habitat description (vegetation, slope, aspect, and substrate) will also be provided to NDOW.
- Injuries to Gila Monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila Monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified during normal business hours. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, habitat, and mapped location.
- Should NDOW's assistance be delayed, biological or equivalent acting personnel on-site may be requested to remove and release the Gila Monster out of harm's way. Should NDOW not be immediately available to respond for photo-documentation, a 35-mm camera or equivalent (5-megapixel digital minimum preferred) will be used to take good quality images of the Gila Monster in situ at the location of live encounter or dead salvage. The pictures, preferably on slide film (.tif or .jpg digital format) will be provided to NDOW. Pictures will include the following information: (1) encounter location (landscape with Gila Monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila Monster should fill camera's field of view and be in sharp focus); (3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

The Nevada NDOW contact for the Gila Monster is Biologist Polly Conrad (702-486-5127, extension 3718) or e-mail (pconrad@ndow.org).

7.1.2 Cultural and Paleontological Resources

Applicant Proposed Measures

APM CR-1: Conduct an Intensive Archaeological Inventory of all Areas that May be Disturbed during Construction and Operation of the Project

A complete cultural resource inventory of the project area has been conducted, details of which are contained in a technical report. Should the project substantially change and areas not previously inventoried for cultural resources become part of the construction plan, SCE shall ensure that such additional areas are inventoried for cultural resources prior to any disturbance. All surveys shall be conducted and documented as per applicable laws, regulations, and guidelines and in accordance with professional standards.

APM CR-2: Avoid and Minimize Impacts to Significant or Potentially Significant Cultural Resources Wherever Feasible

To the extent practicable, SCE shall avoid or minimize impacts to archaeological resources, regardless of its California Register of Historic Resources (CRHR) or National Register of Historic Places (NRHP) eligibility status. This includes siting all ground-disturbing activities defined in Section 5 and other project components outside a buffer zone established around each recorded archaeological site within or immediately adjacent to the right-of-way.

Because many archaeological resources comprise subsurface deposits, features, and artifacts, it may not be possible to recognize all potentially significant attributes of archaeological resources during construction activities. There is the potential for making unanticipated discoveries of previously unidentified remains at archaeological sites that could require efforts to reassess their CRHR or NRHP eligibility. Avoiding impacts or minimizing the area of an archaeological resource that could be affected during construction protects the resource and reduces the possibility that unanticipated discoveries would cause project delays. SCE would avoid or minimize impacts to archaeological resources wherever practicable by redesign, reroute, and implementation of avoidance procedures (i.e., establishing environmentally sensitive areas), capping archaeological sites, or other protective measures within or immediately adjacent to access and spur roads that would be used during construction and operations activities.

Impacts will be avoided or minimized through the following measures prior to construction.

APM CR-2a: Project Final Design Shall Avoid Direct Impacts to Significant or Potentially Significant Cultural Resources

To the extent practicable, all ground-disturbing activities defined in confirm and other project components shall be sited to avoid or minimize impacts to cultural resources listed as or potentially eligible for listing as, unique archaeological sites, historical resources, or historic properties.

APM CR-2b: Conduct a Preconstruction Worker Education Awareness Program

The WEAP will be provided for all proposed project personnel who have the potential to encounter and alter unique archaeological sites, historical resources, or historic properties, or properties that may be eligible for listing in the CRHR or NRHP. This includes construction supervisors as well as field construction personnel. No construction worker will be involved in ground-disturbing activities without having participated in the WEAP.

The WEAP shall include, at a minimum:

- A review of applicable local, state and federal ordinances, and laws and regulations pertaining to historic preservation
- A discussion of disciplinary and other actions that could be taken against persons violating historic preservation laws and SCE policies
- A statement by the construction company or applicable employer agreeing to abide by the Worker Education Program, SCE policies and other applicable laws and regulations
- A review of archaeology, history, prehistory, and Native American cultures associated with historical resources in the proposed project vicinity
- A review of the SCE Unanticipated Cultural Resources Discovery Plan

The WEAP may be conducted in concert with other environmental or safety awareness and education programs for the proposed project, provided that the program elements pertaining to cultural resources is provided by a qualified instructor meeting applicable professional qualifications standards.

APM CR-2c: Establish and Maintain a Protective Buffer Zone around Each Recorded Archaeological Site within or Immediately Adjacent to the Right-of-way

A protective buffer zone will be established around each recorded archaeological site and treated as an "environmentally sensitive area" within which construction activities and personnel are not permitted. Monitoring will be conducted to ensure that the protective areas are maintained.

APM CR-3: Evaluate the Significance of All Cultural Resources that Cannot be Avoided

Cultural resources that cannot be avoided and which have not been evaluated to determine their eligibility for listing in the CRHR or NRHP will be evaluated to determine their historical significance. Evaluation studies shall be conducted and documented as per applicable laws, regulations, and guidelines and in accordance with professional standards.

Evaluation of properties will take into account attributes of each property that could contribute to its historical significance. Evaluation procedures will be consistent with applicable laws, regulations, and guidelines and in accordance with professional standards as follows.

APM CR-3a: Evaluate the Significance of Archaeological Resources Potentially Eligible for CRHR or NRHP Listing

Evaluation of archaeological sites would include scientific excavation of a sample of site constituents sufficient to understand the potential of a site to yield information to address important scientific research questions, per CRHR eligibility Criterion 4 and NRHP eligibility Criterion D. Sites with rock art will be evaluated to consider their eligibility per CRHR Criterion 1 and NRHP Criterion A or C.

Archaeological testing as part of resource evaluation will be carried out in portions of affected sites to recover an adequate sample of cultural remains that can be used to evaluate the significance of a site per CRHR eligibility Criterion 4 or NRHP Criterion D. Archaeological testing will involve scientific excavations; identification of recovered cultural and ecological remains; cataloging, scientific analysis, and interpretation of recovered materials; and preparation of scientific technical reports and reports comprehensible to the general public discussing the archaeological program and its results. Reports of any excavations at archaeological sites will be filed with the appropriate Information Center of the California Historical Resources Information System.

APM CR-3b: Evaluate the Significance of Buildings and Structures Potentially Eligible for CRHR or NRHP Listing

Evaluation of buildings and structures would take into account engineering, aesthetic, architectural, and other relevant attributes of each property. Buildings and structures will be evaluated for historical significance per CRHR eligibility Criteria 1, 2, and 3, and NRHP criteria A, B, and C. A report of the evaluation of each building or structure will be prepared providing a rationale for an assessment of significance consistent with professional standards and guidelines. Reports of significance evaluations of buildings and structures will be filed with the appropriate Information Center of the California Historical Resources Information System.

APM CR-3c: If Necessary, SCE Will Assist the BLM in Consultation with Native Americans Regarding Traditional Cultural Values that May Be Associated with Archaeological Resources

Archaeological or other cultural resources associated with the project may have cultural values ascribed to them by Native Americans. SCE will assist the BLM during consultation with Native Americans regarding evaluations of resources with Native American cultural remains.

APM CR-4: Minimize Unavoidable Impacts to Significant Cultural Resources, Including Unique Archaeological Sites, Historical Resources, and Historic Properties

SCE will make reasonable efforts to avoid adverse project effects to unique archaeological sites, historical resources, and historic properties. Nevertheless, it may not be possible to situate all proposed project facilities to completely avoid impacts to significant cultural resources. Impacts to significant cultural resources will be minimized by implementing the measures listed in APM CR-4a.

APM CR-4a: Implement Measures to Minimize Impacts to Significant Archaeological Sites

Prior to construction and during construction, the following measures will be implemented by SCE to minimize unavoidable impacts to significant archaeological sites:

- To the extent practicable, all activities shall minimize ground surface disturbance within the bounds of unique archaeological sites, historical resources, or historic properties.
- Portions of significant archaeological sites, historical resources, or historic properties that can be avoided will be protected as environmentally sensitive areas and will remain undisturbed by construction activities.
- Monitoring by qualified professionals and/or Native Americans to ensure that impacts to sites are minimized will be carried out at each affected cultural resource for the period during which construction activities pose a potential threat to the site and for as long as there is the potential to encounter unanticipated cultural or human remains.
- Additional archaeological studies will be carried out at appropriate sites to ascertain if project facilities could be located on a portion of a site and cause the least amount of disturbance to significant cultural materials.
- If impacts to significant archaeological (NRHP- or CRHR-eligible) sites cannot be avoided, archaeological data recovery will be carried out in the portions of affected significant sites that will be impacted. A data recovery plan will be prepared, reviewed by the appropriate agencies, and then implemented in order to recover an adequate sample of cultural remains that can be used to address important research questions per CRHR eligibility Criterion 4 or NRHP Criterion D. Archaeological data recovery will involve scientific excavations; identification of recovered cultural and ecological remains; cataloging, scientific analysis, and interpretation of recovered materials; and preparation of a scientific technical report that describes the methods and results of the data recovery program.
- Reports of any excavations at archaeological sites will be filed with the appropriate Information Center of the California Historical Resources Information System.

APM CR-4b: Implement Measures to Minimize Impacts to Significant Buildings and Structures

Prior to construction and during construction, SCE will implement the following measures to minimize unavoidable impacts to significant buildings and structures.

- Locate proposed project facilities to minimize effects on significant buildings or structures.
- If impacts to significant buildings or structures cannot be avoided, document significant architectural and engineering attributes consistent with National Park Service Historic American Buildings Survey/Historic American Engineering Record documentation standards.
- File reports and other documentation with the National Park Service, if appropriate, and appropriate Information Center of the California Historical Resources Information System.

APM CR-5: Prepare and Implement a Construction Monitoring and Unanticipated Cultural Resources Discovery Plan

During construction it is possible that previously unknown archaeological or other cultural resources or human remains could be discovered. Prior to construction SCE will prepare a *Construction Monitoring and Unanticipated Cultural Resources Discovery Plan* to be implemented if an unanticipated discovery is made. At a minimum the plan shall detail the following elements:

- Worker and supervisor training in the identification of cultural remains that could be found in the proposed project area.
- Worker and Supervisor response procedures to be followed in the event of an unanticipated discovery, including appropriate points of contact for professionals qualified to make decisions regarding the potential significance of any find.
- Identification of persons authorized to stop or redirect work that could affect the discovery and their on-call contact information.
- Provide for monitoring of construction activities in archaeologically sensitive areas.
- Stipulate a minimum radius around any discovery within which work will be halted until the significance of the resource has been evaluated and mitigation implemented as appropriate.
- Procedures for identifying and evaluating the historical significance of any find.
- Procedures for consulting Native Americans in the process of identification and evaluation of significance of discoveries involving Native American cultural materials.
- Procedures to be followed for the treatment of discovered human remains per current state law and protocol developed in consultation with Native Americans.

APM CR-6: Inadvertent Discovery of Human Remains

Any human remains discovered during project activities in California will be protected in accordance with current state law, specifically Section 7050.5 of the California Health and Safety Code, Section 5097.98 of the California Public Resources Code, and Assembly Bill 2641. The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) are applicable when Native American human remains are found on federal land (BLM land in California and Nevada). The discovery of human remains will be treated as defined in the Construction Monitoring and Unanticipated Cultural Resources Discovery Plan.

Archaeological excavations at sites will not, if at all possible, inappropriately disturb or remove human remains. Native Americans will be consulted to develop a protocol to be followed if human remains are encountered during any project activity, as required by state and federal law.

When human remains are discovered, work must cease around the find and the area will be flagged off to protect the discovery from disturbance (AB 2641 and NAGPRA). The discovery must be reported immediately to the County Coroner (Section 7050.5 of the Health and Safety Code). If the coroner determines the remains are Native American, the coroner notifies the Native American Heritage Commission (NAHC), which then designates a Native American most

likely descendant (MLD) for the project (Section 5097.98 of the Public Resources Code). The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a document with the county in which the property is located (AB 2641). NAGPRA also requires notification of the appropriate Native American group and certification by that group before the ground-disturbing activity is resumed.

APM CR-7: Native American Participation

Prior to construction, the BLM will consult with Native Americans identified by the NAHC as having cultural ties to particular areas of the proposed project. Native Americans will be consulted regarding their participation during significance evaluations and data recovery excavations at archaeological sites with Native American cultural remains, and monitoring during project construction. Native Americans will be consulted to develop a protocol for working with each group should human remains affiliated with that group be encountered during project activities.

APM PALEO-1: Retention of Paleontologist

Prior to construction, a certified paleontologist would be retained by SCE to supervise monitoring of construction excavations and to produce a Paleontological Resource Management Plan (PRMP) for the proposed project. The PRMP would be prepared and implemented under the direction of the paleontologist and would address and incorporate the PALEO-2 through PALEO-8. Paleontological monitoring would include inspection of exposed rock units and microscopic examination of matrix to determine if fossils are present. The monitor would have authority to temporarily divert grading away from exposed fossils in order to recover the fossil specimens. More specific guidelines for paleontological resource monitoring can be found in the PRMP.

APM PALEO-2: Conduct a Preconstruction Paleontological Field Survey

The paleontologist and/or his designated representative will conduct a preconstruction field survey of the project area underlain by Tertiary rock units and older alluvium. Results of the field inventory and associated recommendations would be incorporated into the PRMP.

APM PALEO-3: Environmental Training

Training would be provided to construction supervisors and crew with environmental awareness training regarding the protection of paleontological resources and procedures to be implemented in the event fossil remains are encountered by ground-disturbing activities.

APM PALEO-4: Construction Monitoring

Ground-disturbing activities would be monitored on a part-time or full-time basis by a paleontological construction monitor only in those parts of the project area where these activities will disturb previously undisturbed strata in rock units of moderate and high sensitivity, as required by the PRMP from APM PALEO-1. Quaternary Alluvium, colluvium, and Quaternary Landslide Deposits have a low paleontological sensitivity level and would be spot-checked on a periodic basis to ensure that older underlying sediments are not being penetrated. Monitoring would not be implemented in areas underlain by younger alluvium unless these activities have reached a depth 5 feet below the present ground surface and fine grained strata are present. Ground-disturbing activities in areas underlain by rock units of low sensitivity would be monitored on a quarter-time basis or spot checked if fine grained strata are present.

APM PALEO-5: Recovery and Testing

If fossils are encountered during construction, construction activities would be temporarily diverted from the discovery and the monitor would notify all concerned parties and collect matrix for testing and processing as directed by the project paleontologist. In order to expedite removal of fossil-bearing matrix, the monitor may request heavy machinery to assist in moving large quantities of matrix out of the path of construction to designated stockpile areas. Construction would resume at the discovery location once the all necessary matrix was stockpiled, as determined by the paleontological monitor. Testing of stockpiles would consist of screen washing small samples to determine if important fossils are present. If such fossils were present, the additional matrix from the stockpiles would be water screened to ensure recovery of a scientifically significant sample. Samples collected would be limited to a maximum of 6,000 pounds per locality.

APM PALEO-6: Prepare Monthly Progress Reports

The project paleontologist would document interim results of the construction monitoring program with monthly progress reports. Additionally, at each fossil locality, field data forms would record that locality, stratigraphic columns would be measured, and appropriate scientific samples submitted for analysis.

APM PALEO-7: Analysis and Prepare Final Paleontological Resource Recovery Report

The project paleontologist would direct identification, laboratory processing, cataloguing, analysis, and documentation of the fossil collections. When appropriate, and in consultation with SCE, splits of rock or sediment samples would be submitted to commercial laboratories for microfossil, pollen, or radiometric dating analysis. After analysis, the collections would be prepared for curation (see APM PALEO-8). A final technical report would be prepared to summarize construction monitoring and present the results of the fossil recovery program. The report would be prepared in accordance with SCE, Society of Vertebrate Paleontology guidelines, and lead agency requirements. The final report would be submitted to SCE, the lead agency, and the curation repository.

APM PALEO-8: Curation

Prior to construction, SCE would enter into a formal agreement with a recognized museum repository and would curate the fossil collections, appropriate field and laboratory documentation, and the final Paleontological Resource Recovery Report in a timely manner following construction.

Implementation of the APMs would avoid and minimize all potential impacts to paleontological resources to a less-than-significant level.

Mitigation Measures

No mitigation measures are necessary for paleontological resources, because the implementation of the APMs will reduce impacts/effects to less than significant. apply to Cultural Resources.

MM CR-1: Cultural Resources Monitoring

The applicant will retain a cultural resources monitor who meets the Secretary of the Interior Standards of a Qualified Professional Archaeologist prior to commencing construction or geotechnical test trenching on the project. The archaeologist will need to be approved by the BLM and will provide construction monitoring for any geotechnical studies that require trench excavation. As mentioned in APM GEO-1, five of the tower installations and 20 percent of the ground-trenching activities are in archaeologically sensitive areas. Monitoring in these areas will be determined by the BLM prior to construction.

Monitoring is necessary because a potential for cultural resources beneath desert pavement surfaces on alluvial planes was recently determined. Such conditions exist throughout much of the Eldorado-Ivanpah Transmission Line Project area. This monitoring effort would be used to protect potential resources and to provide data to help confirm or deny the theory of desert pavement development that would allow for buried cultural resources. The BLM reserves the right to increase the amount of monitoring at any time if conditions reveal the necessity.

No less than 60 days prior to commencement of construction, the archaeologist will present a monitoring plan to the BLM for approval, copies of which the archaeologist will submit to the CPUC. The archaeologist will also provide a report of findings after the monitoring has been completed. Because this geoarchaeological sensitivity has not been widely tested, the BLM is requiring only a small sample of monitoring at this time; further monitoring will only be required if the need is proven.

MM CR-2: Historic American Engineering Record Recordation

Prior to construction of the Eldorado-Ivanpah Transmission Line Project, the applicant will retain a cultural resources specialist qualified to conduct Historic American Engineering Record (HAER) recordation, meeting the Secretary of the Interior Standards. The qualified cultural resources specialist will conduct HAER recordation on Cultural Resources 36-10315 (CA-SBR-10315H)/26CK5685. HAER recordation will be conducted in accordance the Secretary of the

Interior's Standards for Architectural and Engineering Documentation, following Documentation Criteria Level II, as appropriate, for the level of significance assigned to the resources.

MM CR-3: Archaeological Resources Protection Act Training

Prior to construction, the applicant will provide Archaeological Resources Protection Act (ARPA) training with the preconstruction WEAP (APM CR-2b). As required for the WEAP, ARPA training will be presented to all proposed project personnel who have the potential to encounter and alter unique archaeological sites, historical resources, or historic properties, or properties that may be eligible for listing in the NRHP. This includes construction supervisors as well as field construction personnel. No construction worker would be involved in ground-disturbing activities without having participated in the ARPA training portion of the WEAP.

7.1.3 Air Quality

Applicant Proposed Measures

No APMs for air quality resources are proposed.

Mitigation Measures

The following mitigation measures are proposed to reduce the air quality impacts associated with the proposed project:

MM AIR-1: Low-emission Construction Equipment

All construction equipment with a rating between 100 and 750 horsepower (hp) will be required to use engines compliant with U.S. Environmental Protection Agency (EPA) Tier 2 non-road engine standards. In addition, all off-road and portable construction diesel engines not registered under the California Air Resources Board (CARB) Statewide Portable Equipment Registration Program that have a rating of 50 hp or more will meet, at a minimum, the Tier 2 California non-road engine standards, unless that engine is not available for a particular item of equipment. In the event a Tier 2 engine is not available for any off-road engine larger than 100 hp, that engine will be equipped with a Tier 1 engine. The applicant will substitute small electric-powered equipment for diesel- and gasoline-powered construction equipment, where feasible. The applicant will maintain construction equipment according to manufacturing specifications and use low-emission equipment.

MM AIR-2: Enhanced Dust Control Measures

In addition to the dust control requirements by Mojave Desert Air Quality Management District (MDAQMD) and Clark County Department of Air Quality and Environmental Management (CC-DAQEM), the following measures will be implemented for mitigation:

- Frequent watering or stabilization of excavations, spoils, access roads, storage piles, and other sources of fugitive dust (parking areas, staging areas, other), if construction activity causes persistent visible emissions of fugitive dust beyond the work area.

- Pre-watering of soils prior to clearing and trenching.
- Pre-moistening of (prior to transport) import and export dirt, sand, or loose materials.
- Dedication of water truck or high-capacity hose to any soil screening operations.
- Minimization of drop height of material through screening equipment.
- Reduction of the amount of disturbed area where possible.

7.1.4 Water Resources

In its Application to the CPUC, SCE includes design measures and standard operating procedures that are integral components of the proposed project. Defined as APMs, these design measures and operating procedures include activities required for compliance with existing regulations, such as preparing SWPPPs. The impact analysis provided in Section 4.8.4 of the PEA assumes that all APMs are implemented during project execution. If it is determined that SCE's APMs do not fully minimize potential impacts identified, mitigation measures are recommended in Section 6.1.4.

Applicant Proposed Measures

APM W-1: Avoid Stream Channels

Construction equipment will be kept out of flowing stream channels, except when absolutely necessary to construct crossings.

APM W-2: Erosion Control and Hazardous Material Plans

Erosion control and hazardous material plans will be incorporated into the construction bidding specifications, to ensure compliance.

APM W-3: Project Design Features

Appropriate design of tower footing foundations, such as raised foundations and/or enclosing flood control dikes, will be used to prevent scour and/or inundation by a 100-year flood. Where floodplain encroachment is required by the CPUC and/or the BLM, and potential impacts require non-standard designs, hydrology/channel flow analysis would be performed.

APM W-4: Avoid Active Drainage Channels

Towers will be located to avoid active drainage channels, especially downstream of steep hillslope areas, to minimize the potential for damage by flash flooding and mud and debris flows.

APM W-5: Diversion Dikes

Diversion dikes will be required to divert runoff around a tower structure or a substation site if (a) the location in an active channel (or channels) cannot be avoided; and (b) where there is a very significant flood scour/deposition threat, unless such diversion is specifically exempted by the CPUC and/or the BLM authorized officer.

APM W-6: Collect and Divert Runoff

Runoff from roadways will be collected and diverted from steep, disturbed, or otherwise unstable slopes.

APM W-7: Ditch and Drainage Design

Ditches and drainage devices will be designed to handle the concentrated runoff, will be located to avoid disturbed areas, and will have energy dissipations at discharge points. These may include rip-rap, concrete aprons, stepped spillways, etc. Where diversion dikes are required to protect towers or other project structures from flooding or erosion, these dikes will be designed to avoid increasing the risk of erosion or flooding onto adjacent property.

APM W-8: Minimize Cut and Fill Slopes

Cut and fill slopes will be minimized by a combination of benching and following natural topography, where possible.

APM W-9: Prepare and Implement an Approved SWPPP

Prepare and implement an approved SWPPP. As a part of the SWPPP, soil disturbance at tower construction sites and access roads shall be the minimum necessary for construction and designed to prevent long-term erosion through the following activities: restoration of disturbed soil, re-vegetation, and/or construction of permanent erosion control structures.

Implement BMPs in the project SWPPP during construction, to minimize the risk of an accidental release.

APM W-10: Emergency Release Response Procedures

The Emergency Release Response Procedures developed pursuant to APM Haz-2 would be maintained on-site (or in vehicles) during construction of the project.

APM W-11: Conduct a Worker Environmental Awareness Program

Conduct a WEAP to communicate environmental concerns and appropriate work practices, including spill prevention, emergency response measures, and proper BMP implementation, to all field personnel prior to the start of construction. This training program will emphasize site-specific physical conditions to improve hazard prevention. It will include a review of all site-specific plans, including but not limited to the project's SWPPP and Hazardous Substances Control and Emergency Response Plan. SCE will document compliance and maintain a list of names of all construction personnel who have completed the training program.

APM W-12: Properly Dispose of Hazardous Materials

All construction and demolition waste, including trash and litter, garbage, and other solid waste, shall be removed and transported to an appropriately permitted disposal facility.

Petroleum products and other potentially hazardous materials shall be removed and transported to a hazardous waste facility permitted or otherwise authorized to treat, store, or dispose of such materials.

APM W-13: Identify Location of Underground Utilities Prior to Excavation

Prior to excavation, SCE or its contractors will locate overhead and underground utility lines, such as natural gas, electricity, sewage, telephone, fuel, and water lines, or other underground structures that may reasonably be expected to be encountered during excavation work.

APM W-14: Prepare or Update Spill Prevention, Control, and Countermeasure Plans

Prepare or update Spill Prevention, Control, and Countermeasure Plans for substations to minimize, avoid, and/or clean up unforeseen spill of hazardous materials during facility operations.

Mitigation Measures

MM W-1: Erosion Control Plan and Compliance with Water Quality Permits

The applicant will employ a professional engineer to develop and implement an Erosion Control Plan and monitor construction activities to ensure compliance with federal and state water quality permits. The Erosion Control Plan will comply with or exceed BMPs commonly used on projects in the California/Nevada area, and those outlined in county plans. Copies of the Erosion Control Plan will be submitted to the CPUC. The intent of this mitigation measure is to minimize the impact of construction on surface water quality in the basins surrounding the proposed project. It will apply to all construction sites for the duration of construction and restoration activities.

MM W-2: Water Use Plan

The applicant will develop a Water Use Plan that specifies the quantities and sources for all water to be used during construction, operation, and maintenance of the proposed project. The applicant has indicated that water will be used for dust suppression during construction and for toilet flushes and drinking water at the substation. In the applicant's response to Data Request 10.05, they stated that the daily volume of water needed for dust suppression during construction is unknown, because there are numerous variables involved. They estimate that between 30.6 and 38.3 acre feet per annum would be needed for the construction phase of the transmission line. The Water Use Plan will identify the approximate quantity of water to be used for each activity, broken down by phase of the project. The applicant has indicated that water would be supplied by a local vendor or agency. The plan will indicate the water sources to be used for each project phase. For each source, the plan will address the potential impact on the local aquifer. Furthermore, as part of MM W-2, the applicant would limit construction phase water use to a maximum of 45 acre feet per annum and operation phase water use to a maximum of 2.5 acre feet per annum. Emergency water uses, including fire suppression, are excluded from these maxima. To the extent feasible, the applicant will use reclaimed water for dust suppression. The

Water Use Plan will be submitted to CPUC for review at least 3 months prior to the start of construction.

MM W-3: On-site Flow Model and Channel System

The applicant will employ a hydrologist to develop an On-site Flow Model to predict any alteration in flow path that would result from construction and operation and maintenance of the proposed project. The applicant will also develop a channel system to prevent erosion and to mitigate altered flow paths. The On-site Flow Model and channel system design will be submitted to the CPUC for review at least 3 months prior to the start of construction. The intent of this mitigation measure is to ensure that stormwater runoff will not cause flooding. The applicant will monitor the channel system throughout construction to assess effectiveness and ensure compliance with the designed system. Additionally, the applicant will coordinate with the BLM and CPUC on model parameters and assumptions used in modeling.

MM W-4: Dry Lake Restoration Plan

The applicant will employ a hydrologist and a restoration specialist to develop a Restoration Plan for disturbance of dry lake beds. The proposed project would cross through Ivanpah Lake. Construction would disturb the flat dry lake bed surface that is used for recreation. The intent of this mitigation measure is to ensure that the dry lake bed is restored to preconstruction conditions. The BLM will review the plan prior to the start of construction. The BLM would also assess the success of the restoration and determine whether the Ivanpah Lake surface had been restored to preconstruction conditions. The applicant will provide the CPUC with a copy of the Restoration Plan.

MM W-5: Historical Hydrological Model of Alluvial Fan

In the PEA, the applicant completed a historical hydrological model on site area alluvial fan(s), based on similar work on alluvial fans performed near Laughlin, Nevada (House 2005). The applicant extrapolated the data by applying the methodology from the Laughlin area model to the California portion of the project area. This study will be used to determine the active and inactive portions of the alluvial fans in the site area relative to surface water, sediment transport, and flash flooding. Where feasible, the applicant will locate towers, substations, and other permanent site features on inactive portions of the alluvial fan to minimize risk associated with flash flooding and alluvial fan failure.

MM W-6: DESCP, SWPPP, and Grading and Stormwater Management Plan for Ivanpah Substation

The CEC is the lead agency for the ISEGS project. In order to ensure protection of water quality during construction and operation of the ISEGS project, the CEC is requiring ISEGS to prepare and submit a Drainage, Erosion, and Sedimentation Control Plan (DESCP) and to prepare a SWPPP. As part of MM W-6, the applicant will be required to submit copies of the approved DESCP and SWPPP to CPUC 3 months prior to the start of construction, and implement those plans as part of the project.

7.1.5 Geology, Mineral Resources, Soils, and Agriculture

By incorporating SCE's APMs as a defined part of the project, potential geology, mineral resources, and soils related project impacts are minimal. Where a potentially significant impact is identified, mitigation measures are proposed to reduce the impact to less than significant wherever possible.

Applicant Proposed Measures

APM GEO-1: Geotechnical Engineering and Engineering Geology Study

Prior to final design of substation facilities and transmission and subtransmission line tower foundations, a combined geotechnical engineering and engineering geology study would be conducted to identify site-specific geologic conditions and potential geologic hazards in sufficient detail to support sound engineering practices.

APM GEO-2: Recommended Practices for Seismic Design of Substations

For new substation construction, specific requirements for seismic design would be followed based on the Institute of Electrical and Electronic Engineers' 693 "*Recommended Practices for Seismic Design of Substation*," which includes probabilistic earthquake hazard analysis. Other project elements would be designed and constructed in accordance with the appropriate industry standards, as well as good engineering and construction practices and methods.

APM GEO-3: Project Construction Stormwater Pollution Prevention Plan Protection Measures Regarding Soil Erosion/Water Quality

Transmission line and substation construction activities would be conducted in accordance with the soil erosion/water quality protection measures to be specified in the project construction SWPPP. New access roads would be designed to minimize ground disturbance from grading. They will follow natural ground contours as closely as possible, and include specific features for road drainage. Measures could include water bars, drainage dips, side ditches, slope drains, and velocity reducers. Where temporary crossings are constructed, the crossings will be restored and repaired as soon as possible after completion of the discrete action associated with construction of the line in the area.

Mitigation Measures

MM GEO-1: Monitor and Mitigate Damage to Tower Structures

If physical evidence proves groundwater withdrawals are threatening tower locations, SCE would contact the California Department of Water Resources and the Nevada Division of Water Resources to determine groundwater levels. If necessary, SCE will develop a plan to mitigate potential damage to tower structures using standard foundation remediation techniques available.

MM GEO-2: Geotechnical Engineering Study

The applicant will prepare a geotechnical engineering study prior to the final project design to identify site-specific geological conditions and potential geologic hazards. The data collected from the study will be used to guide sound engineering practices and to mitigate potential geologic hazards.

MM GEO-3: Preparation and Implementation of a Stormwater Pollution Prevention Plan

The applicant will prepare a SWPPP for review and approval by the Lahontan Regional Water Quality Control Board (Region 6) and the Clark County Stormwater Quality Management Committee that addresses construction project-related ground disturbances and associated erosion control. The plan will provide the necessary engineering controls and procedures to minimize the impact of stormwater pollution caused by construction activities. A copy of the approved plan will also be submitted to the CPUC.

MM GEO-4: Expansive Soils Mitigation

The applicant will prepare a geotechnical study of the areas of expansive soil(s) identified in APM GEO-1, to develop appropriate design and mitigation measures prior to construction.

7.1.6 Agriculture

Applicant Proposed Measures

No APMs for agricultural resources are proposed.

Mitigation Measures

Because there would be no agricultural impacts resulting from construction and operation of the proposed project and alternative, no mitigation measures would be needed.

7.1.7 Population and Housing

Applicant Proposed Measures

No APMs are proposed for population and housing.

Mitigation Measures

Because population and housing impacts would be less than significant, no mitigation measures would be needed.

7.1.8 Land Use

Applicant Proposed Measures

APM LU-1: Aeronautical Considerations

SCE would submit notice to the Federal Aviation Administration (FAA) electronically, in accordance with FAA procedures and as far in advance of construction as possible.

Mitigation Measures

MM LU-1: Obtain Approval from Clark County and the City of Boulder City for Activities Outside of BLM-Designated Utility Corridors in the Boulder City Conservation Easement

Prior to construction, the applicant must consult with and obtain permission from Clark County and the City of Boulder City regarding construction outside of BLM-designated utility corridors in the Boulder City Conservation Easement (BCCE). The applicant will submit a record of this consultation to the BLM and the CPUC prior to construction.

7.1.9 Wilderness and Recreation

Applicant Proposed Measures

APM REC-1. Recreation Area Closures

When temporary short-term closures to recreational areas are necessary for construction activities, SCE would coordinate those closures with recreational facility owners. To the extent practicable, SCE would schedule construction activities to avoid heavy recreational use periods (e.g., holidays or tournaments). SCE would post notice of the closure on-site 14 calendar days prior to the closure.

Mitigation Measures

MM REC-1: Limit Construction Workspace in Wildlife and Recreational Areas

The applicant will not site extra workspace areas, such as contractor yards in Recreation Areas, to minimize impacts on recreational users during construction. MM REC-1 will not require any monitoring, reporting, or other similar action.

7.1.10 Visual Resources

Applicant Proposed Measures

The following visual resource-specific APMs would be incorporated into the proposed project.

APM AES-1: Road Cut Rock Staining

Where new roads are required in the South McCullough Range to access new or existing transmission and subtransmission towers, SCE would consult with the BLM regarding feasible methods to treat the exposed rock to match the overall color of the adjacent weathered rock.

APM AES-2: Seeding and Inter-Planting

Where new roads are required in the South McCullough Range to access new or existing transmission and subtransmission towers, road cuts would be treated by seeding and/or inter-planting into the disturbed areas to restore the area to an appearance that will blend back into the overall landscape context.

APM AES-3: Non-Reflective Finish

LST and TSP would be constructed of steel that is galvanized and treated at the factory to create a dulled finish that will reduce reflection of light off of the tower members. As appropriate to the environment, the galvanized coating would also be treated to allow the towers to blend into the backdrops. Non-specular transmission cable would be installed for the new transmission line to minimize conductor reflectivity.

APM AES-4: Regrade/Revegetate Construction Sites

Areas around new or rebuilt transmission and subtransmission structures that must be cleared during the construction process would be regraded and revegetated, to restore the area to an appearance that would blend back into the overall landscape context.

APM AES-5: Use Existing Access Roads

To the extent feasible, existing access roads would be used.

APM AES-6: Minimize Road Modifications

Widening and grading of roads would be kept to the minimum required for access by proposed project construction equipment.

APM AES-7: Dust Suppression

During the construction period, dust suppression measures would be used to minimize the creation of dust clouds potentially associated with the use of the access roads.

APM AES-8: Substation Lighting Control

The substation lighting would be designed to be manually operated so that it can be turned on only when required for non-routine nighttime work. The lighting would be directed downward and shielded to eliminate off-site light spill at times when the lighting might be in use.

Mitigation Measures

The following mitigation would be required to lessen impacts on aesthetics and visual resources.

MM AES-1: Painting the Ivanpah Substation

Prior to construction, the applicant will consult with the BLM to select an appropriate color from the BLM approved palette to paint any enclosed structures that would be constructed for the Ivanpah Substation. The applicant will submit photographs, following substation construction, to the BLM and the CPUC to document compliance with this measure.

MM AES-2: Rock Staining near the Ivanpah Substation

For areas that are cleared and/or graded to construct the Ivanpah Substation, the applicant would consult with the BLM regarding feasible methods to treat the exposed rock to match the overall color of the adjacent weathered rock.

MM AES-3: Microwave Dish Color

Prior to construction, the color of the microwave dishes or covers must be approved by the BLM. White dishes or covers will be avoided to minimize color contrast with the existing landscape.

7.1.11 Noise

Applicant Proposed Measures

APM NOI-1: Compliance with Local Noise Ordinances

The proposed construction would comply with local noise ordinances. There may be a need to work outside the aforementioned local ordinances, in order to take advantage of low electrical draw periods during the nighttime hours. SCE would comply with variance procedures requested by local authorities, if required.

AMP NOI-2: Construction Equipment Working Order

Construction equipment would be in good working order.

APM NOI-3: Construction Equipment Maintenance

Construction equipment would be maintained per manufacturer's recommendations.

APM NOI-4: Construction Equipment Muffled

Construction equipment would be adequately muffled.

APM NOI-5: Construction Equipment Idling Minimized

Idling of construction equipment and vehicles would be minimized during the construction.

APM NOI-6: Hearing Protection for Workers

Workers would be provided appropriate hearing protection, if necessary, as described in the Health and Safety Plan.

Mitigation Measures

MM NOI-1: Conduct Construction Activities during Daytime Hours

The applicant would conduct construction activities during times that comply with the local noise ordinance. If construction is necessary outside of the local noise ordinance, a variance would be obtained from the appropriate city or county.

MM NOI-2: Relocate Stationary Construction Equipment

The applicant will locate stationary construction equipment at a site location that is as far away from the Desert Oasis Apartment Complex, as is feasible.

MM NOI-3: Notify Adjacent Residences

The applicant will notify residents within 200 feet of the transmission line, in advance of construction work.

7.1.12 Traffic and Transportation

Applicant Proposed Measures

APM TRA-1: Obtain Permits

If any work requires modifications or activities within local roadway and railroad rights-of-way, appropriate permits will be obtained prior to the commencement of construction activities, including any necessary local permits and encroachment permits.

APM TRA-2: Traffic Management and Control Plans

Traffic control and other management plans will be prepared, where necessary, to minimize project impacts on local streets and railroad operations.

APM TRA-3: Minimize Street Use

Construction activities will be designed to minimize work on, or use of, local streets.

Mitigation Measures

MM TRANS-1: No Lane Closures on I-15 during Friday Peak Usage

The applicant will limit construction activities on Friday afternoon from noon to 10 p.m., so as not to require lane closures on I-15.

MM TRANS-2: Helicopter Flight Plan and Safety Plan

At least 30 days prior to construction of the project, the applicant will coordinate with the FAA for review and approval of any helicopter flight plans that would take place during construction and operation. The applicant will then provide information to the BLM and the CPUC regarding the intended need and use of helicopters during construction and operation of the project, including the flight and safety plan; the number of days and hours that the helicopter would operate; the type and number of helicopters that would be used; the location, size, and number of staging areas for helicopter take-off and landing; and written approval from property owners for use of helicopter staging areas. In the event that plans for the Southern Nevada Supplemental Airport (SNSA) are approved, the applicant will review the helicopter flight and safety plan with the FAA at least 30 days prior to the start of SNSA construction and resubmit the revised plan to the BLM and the CPUC.

MM TRANS-3: Traffic Control Plan

Prior to start of construction of the Eldorado-Ivanpah Transmission Line Project, the applicant will prepare and implement a Traffic Control Plan for the project to address staggering of deliveries on I-15 during peak traffic times.

7.1.13 Public Health and Safety

Applicant Proposed Measures

APM HAZ-1: Phase I Environmental Site Assessment (ESA)

A Phase I ESA would be performed at each new or expanded substation location and along newly acquired transmission or subtransmission line rights-of-way. The Phase I ESA would include an electronic records search of federal, state, and local databases. The electronic records search would be contracted to a company that specializes in this type of work and who would produce a comprehensive report for the new or expanded right-of-way. The report is used to identify sites located on federal, state, and local government agency databases that may have the potential to impact the proposed project. The report would be reviewed and, based on such review, any potential areas of concern along the right-of-way would be identified for further assessment. In addition, a Phase I ESA, which is compliant with ASTM 1927-05, would be performed on all property to be acquired. Based on the results of the Phase I ESA, additional assessment, characterization, and remediation of potential or known subsurface impacts may be conducted prior to construction activities. Such remediation could include the relocation of transmission line structures as necessary to avoid impacted areas, or the removal and disposal of impacted soils and/or groundwater according to applicable regulations.

APM HAZ-2: Hazardous Materials and Waste Handling Management Plan

Hazardous materials used and stored on-site for the proposed construction activities, as well as hazardous wastes generated on-site as a result of the proposed construction activities, would be managed according to the specifications outlined below as follows:

- Hazardous Materials and Hazardous Waste Handling Program: A project-specific hazardous materials management and hazardous waste management program would be developed prior to initiation of the project. The program would outline proper hazardous materials use, storage and disposal requirements, and hazardous waste management procedures. The program would identify types of hazardous materials to be used during the project and the types of wastes that would be generated. All project personnel would be provided with project-specific training. This program would be developed to ensure that all hazardous materials and wastes were handled in a safe and environmentally sound manner. Hazardous wastes would be handled and disposed of according to applicable rules and regulations. Employees handling wastes would receive hazardous materials training and shall be trained in: hazardous waste procedures; spill contingencies; waste minimization procedures; and treatment, storage, and disposal facilities training in accordance with Occupational Safety and Health Administration (OSHA) Hazard Communication Standard and 22 CCR. SCE would use landfill facilities that are authorized to accept treated wood pole waste in accordance with HSC 25143.1.4(b).
- Construction Stormwater Pollution Prevention Plan: A project-specific construction SWPPP would be prepared and implemented prior to the start of construction of the transmission line and substations. The SWPPP would use BMPs to address the storage and handling of hazardous materials and sediment runoff during construction activities (California Stormwater Quality Association 2004).
- Transport of Hazardous Materials: Hazardous materials that would be transported by truck include fuel (diesel fuel and gasoline), and oil and lubricants for equipment. Containers used to store hazardous materials would be properly labeled and kept in good condition. Written procedures for the transport of hazardous materials used would be established in accordance with U.S. Department of Transportation, Caltrans, and Nevada Department of Transportation regulations. A qualified transporter would be selected to comply with federal and state transportation regulations.
- Fueling and Maintenance of Construction Equipment: Written procedures for fueling and maintenance of construction equipment would be prepared prior to construction. Vehicles and equipment would be refueled on-site or by tanker trucks. Procedures would include the use of drop cloths made of plastic, drip pans, and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling stations would be located in designated areas where absorbent pads and trays would be available. The fuel tanks would also contain a lined area to ensure that accidental spillage does not occur. Drip pans or other collection devices would be placed under the equipment at night to capture drips or spills. Equipment would be inspected daily for potential leakage or failures. Hazardous materials such as paints, solvents, and penetrants would be kept in an approved locker or storage cabinet.

- Fueling and Maintenance of Helicopters: Written procedures for fueling and maintenance of helicopters would be prepared prior to construction. Helicopters would be refueled at helicopter staging areas or local airports. Procedures would include the use of drop cloths made of plastic, drip pans, and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling areas would be located in designated areas where absorbent pads and trays are available.
- Emergency Release Response Procedures: An Emergency Response Plan detailing responses to releases of hazardous materials would be developed prior to construction activities. It would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and would include an emergency response program to ensure quick and safe cleanup of accidental spills. All hazardous materials spills or threatened release, including petroleum products such as gasoline, diesel, and hydraulic fluid, regardless of the quantity spilled, would be immediately reported if the spill has entered a navigable water, stream, lake, wetland, or storm drain if the spill impacted any sensitive area, including conservation areas and wildlife preserved, or if the spill causes injury to a person or threatens injury to public health. All construction personnel, including environmental monitors, would be aware of state and federal emergency response reporting guidelines.

APM HAZ-3: Soil Management Plan

A Soil Management Plan would be developed and implemented for construction of the proposed project. The objective of the Soil Management Plan is to provide guidance for the proper handling, on-site management, and disposal of impacted soil that might be encountered during construction activities. The plan would include practices that are consistent with the California Title 8, OSHA regulations, as well as appropriate remediation standards that are protective of the planned use. Appropriately trained professionals would be on-site during preparation, grading, and related earthwork activities to monitor soil conditions encountered. The Soil Management Plan would provide guidelines for the following:

- Identifying impacted soil
- Assessing impacted soil
- Soil excavation
- Impacted soil storage
- Verification sampling
- Impacted soil characterization and disposal

In the event that potentially contaminated soils were encountered within the footprint of construction, soils would be tested and stockpiled. In California, the Certified Unified Program Agency (CUPA) would determine whether further assessment is warranted. In Nevada, the Nevada Department of Environmental Protection (NDEP) Bureau of Corrective Actions (BCA) Spill Hotline (888-331-6337) would be contacted if the quantity of impacted material is greater than 3 cubic yards.

APM HAZ-4: Fire Management Plan

The Transmission Line Project Fire Plan developed by SCE and presented in the PEA as Appendix K would be implemented (National Fire Protection Association 1994).

APM HAZ-5: Spill Prevention, Countermeasure, and Control Plan and Hazardous Materials Business Plan

- Spill Prevention, Countermeasure, and Control Plan. In accordance with Title 40 of the CFR, Part 112, SCE would prepare a Spill Prevention, Containment, and Countermeasures Plan for proposed and/or expanded substations. The plans would include engineered and operational methods for preventing, containing, and controlling potential releases, and provisions for quick and safe cleanup.
- Hazardous Materials Business Plans. Prior to operation of new or expanded substations, SCE would prepare or update and submit, in accordance with Chapter 6.95 of the CHSC and Title 22 CCR, a Hazardous Materials Business Plan (HMBP). The required documentation would be submitted to the designated CUPA in California. (An HMBP or similar documentation is not required by the state of Nevada.) The HMBPs would include hazardous materials and hazardous waste management procedures, and emergency response procedures including emergency spill cleanup supplies and equipment.

Mitigation Measures

MM HAZ-1: Worker Health and Safety and Environmental Training and Monitoring Program

Prior to construction, the applicant will conduct a worker safety and environmental training program. As part of the program, the applicant will develop and implement a Health and Safety Plan. The Health and Safety Plan should address all potential situations that workers could encounter during construction and maintenance, including safety issues that may be unique to any of the alternatives. The Health and Safety Plan, at a minimum, must require that first aid kits be stored in each construction vehicle and that a worker trained in first aid be included in each work group. The purpose and goal of the worker safety and environmental training will be to communicate project-related environmental concerns and appropriate work practices, including spill prevention, emergency response measures, and BMPs, to all field and construction personnel prior to the start of construction. SCE will also conduct health and safety training for Operation and Maintenance activities.

MM HAZ-2: Consultation with FAA Regarding Final Project Design and Possible Hazard/No Hazard Determination

Prior to final project design and as far in advance as possible, the applicant will initiate consultation with the FAA regarding potential requirements due to the proximity of the Eldorado-Ivanpah Transmission Line Project to the proposed SNSA. Depending upon the FAA's recommendations, the applicant may be required to obtain a Hazard/No Hazard Determination. The FAA may also require lighting of Eldorado-Ivanpah Transmission Line Project structures or make additional recommendations regarding safety. The applicant will submit documentation of this consultation to the CPUC and the BLM.

8.0 STABILIZATION AND REHABILITATION

8.1 RECLAMATION, RESTORATION, AND REVEGETATION PLAN

The FEIR/FEIS describes applicable regulatory drivers for this project and appropriate MMs (BLM 2010). The FEIR/FEIS requires preparation of a RRRP (see Appendix A). Its purpose is to guide restoration and revegetation activities for all lands disturbed by construction of the project and the eventual termination and decommissioning of the project. The RRRP intends to address all federal and private land disturbances.

Consultation with and review by the BLM and the CPUC facilitated development of the RRRP. The RRRP also provides details on topsoil segregation and conservation, seed bank replacement, vegetation treatment and removal, salvage of succulent species, revegetation methods including seed mixes, rates and transplants, and criteria to monitor and evaluate revegetation success. Post-construction monitoring is for 1 to 5 years, depending on the disturbance level and restoration level as outlined in the BLM's 2001 Restoration Plan for Energy Projects in the Las Vegas Field Office.

8.2 NOXIOUS WEED SPECIES

The purpose of the Weed Management Plan (provided in Appendix A) is to prescribe methods and procedures to prevent and control the spread of noxious weeds during and following construction of the project. SCE and its contractors will be responsible for carrying out the methods and procedures described in this plan. The scope of the plan is geographically limited only to the area within the rights-of-way issued by the BLM to SCE for construction and operation of the project.

8.3 EROSION CONTROL

New access roads and soil disturbance will be avoided or minimized in all areas designated as having high erosion hazards or potential slope instability. If the authorized officer, after consultation and review of alternatives (including helicopter or helicopter assisted construction), deems the new access road feasible, design plans must be submitted for approval, in writing, prior to construction.

Any new access roads that are required will be designed to minimize ground disturbance from grading. They will follow natural ground contours as closely as possible and include specific features for road drainage, including water bars on slopes over 25 percent. Other measures could include drainage dips, and side ditches. Slope side casting of soil during grading will be minimized. Excess soil and excavated soil will be properly stabilized or, if necessary, hauled to an approved disposal site or dispersed around tower construction sites or on stub or access roads. Where temporary crossings are constructed, the crossings will be restored and repaired as soon as possible after completion of the discrete action associated with construction of the line in the area.

During grading operations, care will be exercised to minimize side casting. No earth will be removed below final elevations, and no cuts will be made deeper than necessary for clearing and road construction.

Upon completion of construction, any drainage deficiencies will be corrected to prevent future erosion. Trees and brush will be cleared only when necessary to provide electrical clearance, line reliability, or suitable access for maintenance and construction.

9.0 OPERATION AND MAINTENANCE

After construction of all project components, SCE will operate and maintain project facilities and equipment in accordance with SCE's standard operational procedures and applicable federal and state regulations. The project components will be unstaffed; continuous operations and monitoring will be provided through control and communication systems. Routine maintenance of the project (and alternative) will occur at least once a year and will involve activities and features related to project components, as described below.

9.1 POWER LINES

Recurring maintenance activities of the transmission, subtransmission, and distribution lines will occur at least once per year. These inspection and maintenance activities will include the following:

- Routine line patrols by both aircraft and truck.
- Routine, patrol-identified structure and wire maintenance.
- Routine, patrol-identified earth and sand abatement from footings.
- Routine right-of-way road maintenance.

The frequency of routine inspection and maintenance activities will depend on several variables, including the length of the line and weather effects. If the magnitude of repairs identified by routine patrols are substantial, other specialized employees such as surveyors, engineers, clerical personnel, and technicians will be added to maintenance crews, as required, to address any unique problem that might arise such as substantial storm damage or vandalism. Routine inspection and maintenance personnel categories will include senior patrol person, supervisor, lead lineperson, journey lineperson, apprentice, ground person, helicopter pilot, equipment operator, and laborer.

The entire transmission line corridor will be patrolled at least annually. The patrols will alternate between helicopter and truck. In the first year, the corridor will be patrolled by helicopter, which will take approximately 1 day (8 hours) to accomplish. The next year, a truck patrol will take 5 days. Increases in pollution and population density in the vicinity of the transmission line corridor could cause SCE to increase the patrol frequency. These additional patrols will be performed by helicopter or patrol truck.

During a typical patrol, a helicopter will fly at or near the elevation of the support for the conductor. In populated areas, patrols will fly at higher elevations or away from the centerline of the transmission lines to avoid flying close to houses or penned animals. In cases where flying near a populated area cannot be avoided, the patrol person will use gyrobinoculars to increase the inspection distance between the structures and the helicopter to the greatest extent possible. In rural areas, unless designated otherwise, proximity to the ground will not be restricted except for safety and environmental reasons.

Helicopter operations will be supported by local airports, such as the Jean Sport Aviation Center and the SNSA (currently in planning phase). Before any helicopter operations will occur for the project operations and maintenance, SCE will be required to coordinate with the CCDOA and/or the FAA.

Approximately 15 years after the initial operational date, maintenance on the transmission line will be expected to increase. Initial additional corridor maintenance will be due principally to weather and vandalism to the new line. As insulators and steel age on the line, the frequency of lattice steel structure hardware maintenance activities, such as bolt torquing, will increase.

9.2 SUBSTATIONS

Considering the project's specific features and the typical climate conditions of the project area (desert), the Ivanpah Substation will require 14 visits per year for operational activities, and 20 to 25 visits per year for maintenance.

Operation of the Ivanpah Substation will require use of electric, fuel, transportation, solid waste, and communication services. Electric service will be provided by the two distribution systems described in Section 2.1.1. Leased and internal phone communication line services will be also required.

Currently, SCE does not anticipate the need for a permanent water supply at the Ivanpah Substation during operations. SCE is evaluating options for a portable or permanent self-contained restroom facility for use during operation and maintenance activities. The restroom facility will have a self-contained holding tank and the wastewater will be disposed of by contract service personnel. During construction, the site will be serviced by portable restroom facilities and the wastewater will be disposed of weekly or more frequently, depending on the number of construction personnel and usage. The physical location and type (portable or permanent) of self-contained restroom facilities will be determined during final engineering.

Solid waste handling and disposal procedures at the substation sites will be conducted as specified in SCE's Waste Disposal Plan, the *Salvage Services Manual*, and the Waste Management Manual. In addition, SCE will have contracts in place with approved waste contractors and landfill disposal sites prior to commencement of construction activities.

Hazardous materials that might be used during operations and maintenance at the project substations will include transformer oil, dielectric fluids used in capacitors, fuels (diesel and gas), lube oils and grease, used oil, propane, sulfur hexafluoride gas, compressed gases such as argon and nitrogen, and solvents, coatings, and paints. Additionally, any piece of equipment or

structure removed as part of operations and maintenance might be hazardous waste. SCE will manage, control, and dispose of all potentially hazardous materials generated as a result of project operations and maintenance in accordance with applicable regulatory requirements and standard procedures.

Specialized personnel will visit the new Ivanpah Substation to conduct routine maintenance activities. Current regular maintenance activities at the existing Eldorado Substation will also continue after the upgrades. Other visits to the substation might be required to support repairs, outages, and other related work activities as required by maintenance, testing, and engineering personnel. SCE will mobilize vehicles from other locations to the Ivanpah Substation for both routine and emergency maintenance activities, as required.

9.3 TELECOMMUNICATION SYSTEM

Maintenance personnel will conduct routine maintenance for the telecommunication equipment and facilities, including the microwave communication site, the emergency generator, and the communication room/MEER at the Ivanpah Substation. Other visits to the telecommunication facilities will be necessary if repairs are needed, if there are equipment or network faults, or other related work is needed.

Routine maintenance to the telecommunication facilities at the Ivanpah Substation will be performed once a year. In addition, the following maintenance activities will be performed once a year at the microwave site in Nipton:

- Telecom equipment maintenance;
- Propane tank refueling (contractor);
- Air-conditioning servicing (contractor); and
- Building maintenance (contractor).

9.4 DECOMMISSIONING

A transmission system's lifetime usually exceeds 80 years with proper maintenance. As mentioned above, approximately 15 years after the operational date, the frequency of maintenance on the line will be expected to increase. In addition, SCE will implement a regular program to replace damaged structure hardware.

SCE will maintain the project over its lifetime in accordance with the timeframe to be established by the BLM in the right-of-way grant. The BLM typically grants a 30-year right-of-way, with a right of renewal for generation and transmission facilities. Within a reasonable time following termination of the BLM right-of-way grant, SCE will prepare a Removal and Restoration Plan prior to decommissioning of the facilities. The Removal and Restoration Plan will address removal of SCE's facilities from the permitted area and any requirements for habitat restoration and revegetation to a condition that is comparable to the surrounding topography and vegetation with stable slopes and minimal erosion. The Removal and Restoration Plan will then be approved by the BLM before implementation.

9.5 SAFETY

In order to maintain a safe work environment, and assure that maintenance and restoration is done safely, a minimum right-of-way width of 80 feet for monopole circuits, and 100 feet for lattice circuits is required. The 80-foot/100-foot right-of-way will limit any need to de-energize both of the Ivanpah circuits to do routine maintenance, and will provide a safe distance for any mid-span maintenance from future circuits that may be built along the same corridor.

9.6 FIRE CONTROL

The crews will carry and are trained in the use of fire extinguishers. Each crew will carry hand tools to extinguish and control a small fire. The crews will have access to a water-carrying vehicle to support construction and maintenance activities. SCE will be liable for all fire suppression costs resulting from fires caused by construction or operation activities, and shall comply with all guidelines and restrictions imposed by agency fire control officials.

9.7 NOXIOUS WEED CONTROL

Concerned parties may contact SCE to report the presence of noxious weeds within the project right-of-ways. SCE will control noxious weeds on a case-by-case basis, and coordinate with BLM on treatment methods. A summary of actions taken will be provided in the next annual Restoration Monitoring Report. SCE personnel will attend noxious weed training, provided annually by BLM, to aid in the identification of noxious weed populations, and will report spreads of noxious weeds during the normal course of maintenance (see Appendix A).

9.8 LONG-TERM ACCESS

Long-term access to the right-of-way after construction will be provided by the same access roads used during construction.

9.9 CONTINGENCY PLAN

SCE will reduce downtime through several procedures. SCE has purchased Emergency Restoration Structures. These are available for quickly restoring the line to service on a temporary basis until a scheduled outage can occur for the line to be permanently restored. SCE maintains an emergency stock of materials for transmission lines, including structures, conductors, and insulators and hardware, and has a written Emergency Restoration Plan. The emergency stock is stored in secured locations at various substations strategically located to be accessible for emergencies. SCE conducts mock-emergency drills to improve response time.

10.0 TERMINATION AND RESTORATION

One year prior to the anticipated abandonment of the project, SCE will submit a Termination and Decommissioning Plan for approval by the authorized officer. The Removal and Restoration Plan will address removal of SCE facilities from the permitted area, and any requirements for

habitat restoration and revegetation. The Removal and Restoration Plan will be approved by the BLM before implementation.

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Eldorado-Ivanpah Transmission Project

Appendix A – Mitigation Plans

Reclamation, Restoration and Revegetation Plan

Desert Tortoise Survey

Invasive Plant Management Plan - Weed Management Plan

Mitigation Monitoring for Affected Jurisdictional Areas

Lighting Plan

Burrowing Owl Survey

Avian Protection Plan

Raven Management Plan

Unanticipated Discovery Plan

Stormwater Pollution Prevention Plans (SWPPP)

Paleontological Resource Management Plan

Accident Prevention Manual

Injury & Illness Prevention Program

Appendix A – Mitigation Plans

Eldorado-Ivanpah Transmission Project

Reclamation, Restoration and Revegetation Plan

ELDORADO TO IVANPAH TRANSMISSION PROJECT
RECLAMATION, RESTORATION AND REVEGETATION PLAN

Prepared for:

United States Department of the Interior
Bureau of Land Management
Las Vegas Field Office

Prepared by:

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May 10, 2011
(Revised October 12, 2011)

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1 INTRODUCTION

This document presents a comprehensive plan to reestablish appropriate native vegetation including special status plant populations and succulent specimens in areas disturbed during construction of the Eldorado-Ivanpah Transmission Project (Project or EITP) by Southern California Edison (SCE). This Reclamation, Restoration, and Revegetation Plan (RRRP) describes the methods for site preparations, planting, maintenance and monitoring conducted to implement and record the reclamation process, and sets forth performance criteria for measuring the success of habitat restoration efforts.

Preparation and implementation of this RRRP is required by Mitigation Measure (MM) BIO-2 Reclamation Plan established in the EITP Final Environmental Impact Report / Environmental Impact Statement (FEIR/EIS) (California Public Utility Commission [CPUC] 2009). This plan integrates relevant guidance developed by and for the Bureau of Land Management (BLM) and will also facilitate compliance with Nevada and California state laws and regulations that protect native plants.

Construction of the EITP will disturb numerous discrete areas along the project alignment which would be reclaimed as prescribed herein. The level of effort needed to revegetate each particular area is expected to correlate with the level of disturbance experienced during construction as discussed later in this plan.

1.1 Plan Purpose, Need and Objectives

The purpose of this Plan is to guide restoration and revegetation activities for all naturally vegetated lands temporarily disturbed by construction of the EITP and by the eventual termination and decommissioning of the Project. The Plan is required to fulfill MMs identified in the FEIR/EIS, specifically MM BIO-2 which requires preparation and implementation of this RRRP and MM BIO-3 which requires mitigation for impacts to special status plants.

Consistent with the FEIR/EIS, the RRRP addresses mitigation for special-status plant species that may be disturbed or damaged by project construction. Special-status plant populations may be reestablished by salvaging seed and/or plants and topsoil from existing populations that would be affected and replacing topsoil and propagules in appropriate receptor sites as close as possible to impacted areas. This mitigation will begin immediately following construction and will be completed within one year of completion of construction in areas containing special status plant populations (See Appendix A, MM BIO-3).

This habitat restoration plan proposes several methods to assist and promote rapid recovery of native vegetation in areas impacted by construction of the proposed EITP

alignment. The RRRP provides detailed guidelines and specifications for site preparations including topsoil salvage, storage and redistribution and replacement of individual succulent specimens, general planting guidance including seed palettes and seed application; maintenance activities including treatment and removal of weedy species. This plan also presents performance standards and guidelines for reclamation progress and specifies reporting requirements. Post-construction monitoring is required for a minimum of 5 years for transplanted succulent specimens and also for 5 years for special status plants and all other revegetated areas.

1.2 Project Overview

SCE proposes to interconnect and deliver up to 1,400 megawatts (MW) from proposed renewable energy development facilities in the Ivanpah Valley area. The existing regional transmission lines cannot accommodate the additional power generated by the anticipated renewable energy projects in the Ivanpah Valley area. The EITP will connect planned renewable energy sources to the California Independent System Operator's (CAISO)-controlled transmission grid. The CAISO plans and approves transmission interconnections and maintains an Interconnection Request Queue of generation projects with active requests for access to the transmission grid. The EITP would also improve line reliability consistent with compliance standards outlined by the North American Electric Reliability Corporation (NERC).

As described in supporting environmental documentation, the purposes of the EITP are:

- To connect renewable energy sources in the Ivanpah Valley area in compliance with Executive Order 13212, the Energy Policy Act of 2005, the Federal Power Act, California Senate Bill 1078, and California Senate Bill 107;
- To improve reliability in compliance with applicable standards, including NERC, Western Electricity Coordinating Council (WECC), CAISO, and SCE standards;
- To maximize the use of existing Right of Way (ROW) and designated utility corridors to minimize impacts on environmental resources.

The project entails: 1) removing and replacing the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115-kV transmission line with the new Eldorado-Ivanpah 220-kV double-circuit transmission line; (2) installation of a fiber-optic telecommunication route and microwave transmitters; and (3) a subtransmission line to connect the proposed Ivanpah Substation to the existing 115-kV subtransmission system. Site preparation and construction would be accomplished using different types of equipment and vehicles to facilitate multiple project efforts such as road clearing and grading, dismantling and removal of existing facilities, moving equipment and material, and installing project components. Equipment to be used would include small vehicles, such as pick-up trucks, up to large semi-trucks for hauling equipment, material, and personnel, specialized trucks for specific work elements such as drill rigs, concrete mixers, pumping trucks, bucket trucks, as well a as lattice boom crane, rough terrain crane, and truck 80-ton cranes and other support trucks for moving and erecting the

towers and substation equipment. Helicopters will potentially be used in areas where access is limited or impractical for particular activities and for transmission line stringing operations. Tensioning, pulling, and splicing equipment will be used for wire stringing operations.

1.3 Project Location

The alignments for the EITP transmission line replacement and redundant communication line are located in the Mojave Desert in southwestern Nevada and eastern California in the general vicinity of Primm, Nevada (Figure 1). The transmission line element of the EITP spans approximately 35 miles between the existing Eldorado Substation and the proposed Ivanpah Substation. Approximately 28 miles of the project is in Nevada and 7 miles in California. Elevations within the EITP project area range from less than 1,800 feet (above mean sea level) in the area of the Eldorado Substation to approximately 5,000 feet in the McCullough Range. Ivanpah Dry Lake is an important geographic feature located just west of the California border which lies at an elevation of approximately 2,605 feet.

1.4 Biological Setting

The EITP is geographically located in the Mojave Desert floristic region. The major plant community types in the project area include several desert scrub types and one woodland association, including Creosote-White Bursage Scrub, Mojave Yucca Scrub, Black Bush Scrub, Desert Wash Scrub and Joshua Tree Woodland. Descriptions of these plant communities are provided in Appendix B (Vegetation Types in the EITP Project Area), and mapping of the location and configuration of these communities is depicted on Figure 2 in relation to the project alignment. These plant communities and associated botanical elements are described in detail in the *Eldorado-Ivanpah Draft Environmental Impact Report/Environmental Impact Statement* (CPUC 2009) and the *Eldorado-Ivanpah Transmission Project Supplemental Biotechnical Report: 2010 Botanical Survey* (AECOM 2010a).

1.5 Applicable Mitigation Measures

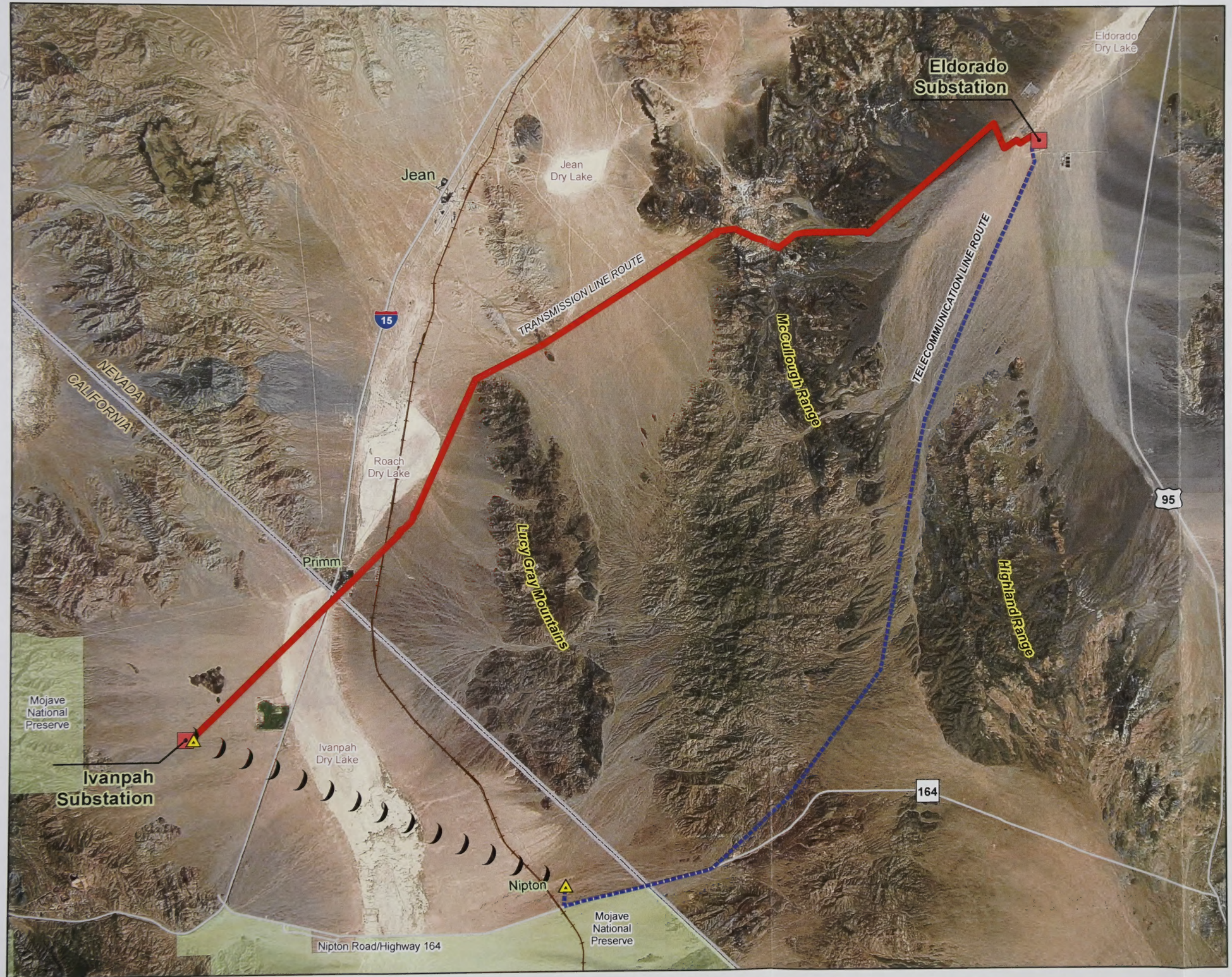
Applicant proposed measures (APM) and mitigation measures (MM) developed to address environmental impacts associated with the EITP are identified in the FEIR/EIS. APM BIO-2 and MM BIO-2, presented below in their entirety, specifically address development of this restoration plan.

- **APM BIO-2: Minimize Vegetation Impacts.** Every effort would be made to minimize vegetation removal and permanent loss at construction sites. If necessary, native vegetation would be flagged for avoidance.

- **MM BIO-2: Reclamation Plan.** The applicant will develop a Reclamation, Restoration, and Revegetation Plan (RRRP) prior to adoption of the Final

Eldorado-Ivanpah Transmission Project
Reclamation, Restoration and Revegetation Plan

Figure 1
Project Vicinity



LEGEND

- Substations
- Microwave Tower
- Transmission Line Route
- Telecommunication Line Route
- Railroads
- Streets/Highways
- State Boundary
- Mojave National Preserve
- Microwave Signal

0 2 4 Miles
0 2 4 Kilometers
1:180,000 1 inch = 15,000 feet

SCE Corp Environment, Health & Safety
Eldorado-Ivanpah Transmission Project
Projection: NAD 83 UTM Zone 11N
Date: 4/13/2011

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Eldorado-Ivanpah Transmission Project
Reclamation, Restoration and Revegetation Plan

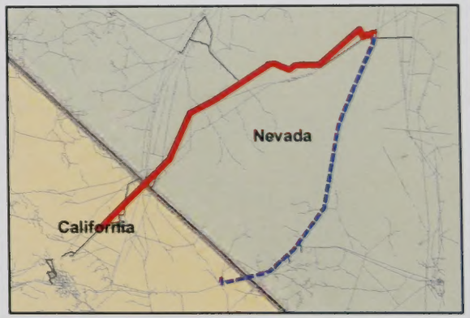
Figure 2
Plant Communities

LEGEND

- Substations
- Microwave Tower
- Black Bush Scrub, (BBS)
- Black Bush Scrub-Joshua Tree Woodland, (BBJT)
- Black Bush-Juniper Scrub, (BBJS)
- Creosote Scrub, (CS)
- Creosote-White Bursage Scrub, (CWB)
- Desert Wash, (DW)
- Developed, (DEV)
- Disturbed Creosote Scrub, (DCS)
- Disturbed, (DST)
- Dry Lake Bed, (DL)
- Pinon Pine-Juniper, (PPJ)
- Saltbush Scrub, (SBS)
- Transmission Line Route
- Telecommunication Line Route
- Railroads
- Streets/Highways
- State Boundary
- Microwave Signal

0 2 4 Miles

1:180,000 1 inch = 15,000 feet



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- EIR/EIS that will guide restoration and revegetation activities for all disturbed lands associated with construction of the project and the eventual termination and decommissioning of the project. The RRRP will be part of the applicant's final Plan of Development for the project and should address all federal and private land disturbances including areas where restoration activities have been funded by the Clark County MSHCP and initiated by resource agencies. The RRRP will be developed in consultation with appropriate agencies (BLM, CPUC, CDFG, and Clark County DCP) and be provided to these agencies for review prior to preparation of the Final EIR/EIS. NDOW and the BLM Las Vegas Field Office will be consulted for restoration efforts concerning Nevada State protected cacti and yucca species, which may include preparation of a separate Cactus and Yucca Reclamation Plan. The RRRP will also provide details including but not limited to topsoil segregation and conservation, vegetation treatment and removal, salvage of succulent species, revegetation methods including seed mixes, rates and transplants, and criteria to monitor and evaluate revegetation success. Post-construction monitoring will be performed for 1 to 5 years, depending on the disturbance level and restoration level as outlined in the BLM's 2001 Restoration Plan for Energy Projects in the Las Vegas Field Office.

Several other APMs and MMs set forth in the FEIR/EIS also contain elements or require actions that are relevant to this plan; these are included in Appendix A - Relevant Mitigation Measures.

1.6 Disturbance Levels

Disturbance of natural areas that may occur as the result of construction or demolition activities is categorized into three general levels following the general disturbance levels described in the "Restoration Plan for Energy Projects in the Las Vegas Field Office" (2001). Reclamation efforts will vary depending generally on the level of disturbance a particular area experiences. More severe disturbance will generally require more intensive reclamation efforts. Disturbance classifications area as follows:

1.6.1 Overland Drive and Crush (D-1)

Overland drive and crush involves disturbance caused by accessing a site but without significantly modifying the landscape. Vegetation is crushed but not cropped or removed. Soil is compacted, but no surface soil (topsoil) is removed. Even though vegetation may be damaged and even destroyed, the topsoil and seed bank remains in place. Some crushed vegetation will likely re-sprout after disturbance ceases. These activities would result in minimal to moderate disturbance and will be implemented whenever vegetation and/or soil removal is not required.

1.6.2 Clear and Cut (D-2)

Clear and cut disturbance generally applies to areas where equipment access is required such that all above ground vegetation must be removed, usually by brush

cutting or mowing, to improve or provide suitable access. In these situations, soils are also typically compacted to some degree by equipment activity in discrete paths or patches, but topsoil is not removed. Therefore, the Clear and Cut category constitutes a moderate level of disturbance.

1.6.3 Clear and Cut with Soil Removal (D-3)

This category of disturbance is caused by removing all vegetation and excavating, trenching, or otherwise displacing surface soil due to and may frequently involve compaction. Areas subject to grading, trenching, or other earthwork activities are deemed highly disturbed and will require more extensive remedial efforts to accomplish reclamation.

1.7 Proposed Project Disturbance

Temporary disturbance areas will include tower construction and demolition sites as well as helicopter landing zones, construction staging and material laydown yard areas, pulling and tensioning stations, cable splicing areas, and temporary access roads. These and other project elements that may cause disturbance to natural areas are listed in detail in Tables 1A through 1E which list Disturbance Acreages by Project Activity and Disturbance Types, included herewith as Appendix C. Depending on the type of construction activity, temporary disturbance may involve any and all levels of disturbance that may result from vehicle access and maneuvering, vegetation removal, site leveling and grading when necessary, and other ground disturbance.

Table 1 indicates estimated disturbance acreages for each disturbance level listed separately for each major project element. Table 2 lists project impacts by disturbance level. Table 3 summarizes impacts by vegetation type. The acreages provided herein are estimates only and are generally based on a "worst-case" scenario. When available, actual disturbance calculations based on final construction plans are likely to vary from these estimates and should be significantly lower overall.

Table 1. Major Project Elements and Temporary Habitat Impact Totals

EITP Project Feature	Approximate Acres of Habitat Temporarily Disturbed
TOTAL TEMPORARY IMPACTS FOR TRANSMISSION ROUTE	290.6
TOTAL TEMPORARY IMPACTS FOR TELECOMMUNICATIONS ROUTE	27.2
TOTAL TEMPORARY IMPACTS FOR OTHER PROJECT FEATURES	7.2
GRAND TOTAL OF EITP TEMPORARY IMPACTS	325.0

Table 2. Project Impact Totals by Disturbance Level

Disturbance Level Mitigation	Telecommunication Route	Transmission Line Route	Other Project Features	Approximate Project Total
	Acres	Acres	Acres	Acres
D-1	26.20	130.07	0.68	156.95
D-2	0.18	160.52	6.11	166.81
D-3	0.74	0.00	0.39	1.13
Total	**27.12**	**290.59**	**7.18**	**324.89**

Table 3. Temporary Disturbance by Vegetation Type

Vegetation Community	Telecommunication Route	Transmission Line Route	Approximate Project Total
Creosote Bush – White Bursage Scrub	15.8	254.4	270.2
Creosote Bush Scrub	0.00	30.7	30.7
Black bush Scrub	1.36	0.00	1.36
Black bush – Joshua Tree Woodland	8.43	0.00	8.43
Desert Wash Habitat	1.27	3.95	5.22
Saltbush Scrub	0.00	7.51	7.51
Total Acres	**26.9**	**296.6**	**323.5**

1.8 Project Decommissioning

In the event that transmission lines and supporting tower networks are decommissioned and removed from service, disturbance of natural vegetation communities associated with future tower and line demolition will require restoration consistent with the current approved guidelines in use at that time. Demolition activities will likely involve levels of disturbance and equipment access effects roughly similar to the effects of construction. Therefore, restoration, revegetation and reclamation efforts implemented during and after project construction (and proven effective during monitoring) would provide a model to be referenced when planning for restoration of natural areas disturbed during the future decommissioning of the EITP.

It is recommended that project sites be surveyed at least one or two years prior to commencing decommissioning and removing equipment and material using approved methodology, with reference to the project's monitoring reports generated during the implementation of this RRRP for comparison with existing conditions just prior to

decommissioning. Moreover, the restoration monitoring reports should provide insight into the preferred methods employed based on the results obtained during the revegetation process post-construction. As restoration methods and techniques may improve over time, future restoration practices should implement any improved methods that may then be available and, based on further experience, would be expected to produce desired results.

In order to facilitate restoration efforts that may involve re-seeding (i.e., where surface soils are substantially disturbed), seed collection is recommended to commence at least one to two years prior to disassembly/demolition, preferably during at least an average rainfall year to obtain appropriate quantities of seed from appropriate species.

2 RECLAMATION, RESTORATION AND REVEGETATION METHODOLOGY

2.1 Recording Pre-Construction Conditions and Project Disturbance

During construction, project activities will be monitored in accordance with mandatory mitigation measures (e.g., APM's BIO-2, -4, -5, and MM BIO-1) which are intended to avoid or minimize impacts to natural vegetation and especially to sensitive biological resources. As part of the construction monitoring effort, impacts will be observed and recorded for many discrete areas that cannot be avoided by construction. In order to compare project impacts with pre-construction conditions, it will first be necessary for monitors to describe pre-construction conditions in each affected area in terms of the plant communities present, the existing percent coverage by both native and non-native vegetation, number of dominant species present. Pre-construction observations must also document the soils present, the slope aspect(s) of each area, and any observed disturbance from previous or historic activities. Finally, any cacti and yucca specimens or other unique elements present must be inventoried. During construction, the types of disturbance activities (e.g., vehicle transit, heavy equipment, material storage) and the level of disturbance (e.g., D-1, D-2, or D-3) observed within each discrete area will be recorded.

Any other actions taken relevant to restoration such as removal of succulent specimens, various site preparations such as soil salvage, re-contouring, decompaction, or weed control efforts that occurred during or at the end of construction should also be recorded for each discrete disturbance area.

Moreover, it will be particularly helpful to prepare and maintain a photographic record of as many discrete areas that will be impacted as possible for comparative analysis with baseline conditions over time. The next section describes the need for an identification system to enable monitors to collect information on a large number of discrete sites or "patches" and maintain the observation record in a form that will allow it to be used to also implement the appropriate restoration efforts as well as track the progress of each site. Information reported about each site's pre-construction condition and observed disturbance should be included with or attached to the Initial Conditions Site Assessments which collate and/or clarify the known information about each disturbed area at the end of construction and the outset of restoration, as described in Section 2.1.2 below.

2.1.1 Identification System for Disturbed Sites

It will be necessary to employ a rational system to identify and track discrete impact areas to facilitate monitoring and tracking the progress of reclamation. Such a system will help to track reclamation efforts from the time when construction activities are completed over the five year reclamation monitoring period. In fact it will be necessary

to employ this system during the construction monitoring process to assure that information about pre-construction conditions and disturbances are provided in a format that will promote implementation of appropriate restoration efforts and allow progress monitoring to be compared with actual baseline conditions for each discrete area.

Such a system may consist of the following elements. A series of impact sites may be grouped according to the geographic area associated with a given project segment, as follows for the Transmission Line segments: Eldorado Substation to McCullough Range, McCullough Range; McCullough Range to Lucy Grays pass; Lucy Grays Pass to Primm, Ivanpah Dry Lake, Ivanpah Dry Lake to Ivanpah Substation. A similar set of geographic segments would be attributed to the Telecommunications Line and other project features. Then, each named segment would include a list of existing towers being demolished and/or a list of new towers being constructed (for 220 kV transmission) or modified (to allow installation of the new optical ground wire). Thus, for the project segment from the Eldorado Substation to the McCullough Range, new towers would include those numbered from No. 1 to No. 64, and existing 115 kV H towers to be demolished would include those numbered from No. 260, at the Substation, to No. 189, at the base of one outcrop leading into the mountainous area. Likewise, pulling stations, temporary access roads, lay down sites, and miscellaneous other discrete impact areas could be readily referenced according to the nearest individual tower using compass headings and distance from the referenced tower (i.e., Tower "X", pulling station, NW 280'). Each discrete impact area would be assigned a reference name according to the geographic location of the relevant EITP segment first, the associated Tower second, and then, if needed, by compass heading and distance from the tower.

2.1.2 Initial Conditions Site Assessments

Monitoring of each discrete site will commence with an initial condition assessment to be completed when construction activities are completed in a given area. Each site will be inspected and compared with pre-construction conditions (from the construction monitor's records, including site photographs, and/or aerial photography. The size and configuration of each discrete area will be measured or confirmed with the construction monitor's notes, photos will be taken and brief description of the existing conditions and observed impacts associated with the site will be provided. Recommendations for reclamation and revegetation efforts and monitoring frequency will also be included along with any other relevant comments. A sample form for the Initial Conditions Site Assessment is included as Appendix D as a guide to assist with assessing site disturbance and listing recommendations for reclamation treatment. Completion of these assessment sheets will also help by establishing the starting point for the monitoring effort. Several hundred of these Assessments are expected to be needed to document conditions at the many discrete sites along the entire project alignment. It is also important to recognize that since construction will not be completed at the same time for the entire project alignment, restoration monitoring will also commence at different times for different parts of the project.

2.2 Reclamation, Restoration and Revegetation Approach

It is expected that most of the temporary disturbances associated with Project construction will involve Overland Drive and Crush (D-1) and lesser but still substantial fraction of all disturbance will consist of Clear and Cut (D-2) type disturbance. A more limited amount is expected to be subject to Clear and Cut with Soil Removal (D-3) type disturbance. The following sections describe the various methods that will be used to reclaim, restore, and revegetate D-1, D-2 and D-3 disturbance areas along the proposed project ROW. Habitat restoration methodologies will be adapted to suit each treatment area, and may be subject to refinements to address specific conditions in discrete restoration sites and depending on site floristic composition and specific disturbance issues.

In general, passive restoration will be implemented for the majority of areas subject to D-1 impacts. Passive restoration requires assessing site-specific impacts and applying methods such as raking to remove tracks, and maintenance to control weeds and promote growth of native vegetation. For areas exposed to more substantial disturbance, more labor intensive restoration efforts are proposed that may involve salvage and redistribution of topsoil, seeding, vertical mulch application, aggressive weed control and monitoring.

Table 4 summarizes general restoration strategies for each disturbance level.

Table 4. Disturbance Level and RRRP Approach

Disturbance Level	Site-Specific Conditions	Likely Restoration Methods
D-1 (157 acres)	• Minimum disturbance to vegetation and soil (represents the majority of D-1 level affected areas – e.g., 80% of total D-1 impacts: 130- 140 ac.)	• Raking, if deemed necessary • Weed control, as needed • Salvage of cactus & yucca • Monitoring
	• Vegetation crushed, soil slightly disturbed - possibly exposed to weed invasion or erosion (expected to affect limited patch areas, e.g., less than 20% of D-1 level impacts: 20 – 30 ac.)	• Raking • Weed control • Vertical mulch application (if topsoil displaced) • Hand seeding (if topsoil displaced) • Weed control • Salvage of cactus & yucca • Monitoring
D-2 (167 acres)	• Minimum soil disturbance and vegetation disturbance limited to cutting aboveground (expected to represent the majority of D-2 Level impacts; e.g., 70 %: 120 – 130 ac.)	• Raking, if deemed necessary • Salvage of cactus & yucca • Monitoring
	• Soil slightly disturbed - possibly exposed to weed proliferation or erosion (expected to affect limited patch areas, e.g., less than 30% of D-2 level impacts: 40 – 50 ac.)	• Raking • Vertical mulch application • Hand seeding • Soil stockpiling and re-spreading (as deemed necessary) • Weed control • Salvage of cactus & yucca • Monitoring
D-3 (1-acre)	• Vegetation and soil removed	• Soil stockpiling and re-spreading • Re-contouring • Vertical mulch application • Seeding (imprinting or by hand) • Weed control • Salvage of cactus & yucca • Monitoring

2.2.1 Botanical Survey Results

Complete botanical surveys of the Project area were conducted in 2010 (AECOM 2010a and b) and more recently in 2011 (AECOM 2011), to document the presence of cactus and yucca, and to update the distribution of rare plants and invasive weeds. Previous general biological and botanical studies identified and mapped the distribution of dominant plant communities throughout the project area.

The 2010 surveys observed four sensitive plant species within the entire EITP project study area. These include matted cholla (*Grusonia parishii*), rosy two-toned beardtongue (*Penstemon bicolor* ssp. *roseus*), white-margined beardtongue

(*Penstemon albomarginatus*), and small-flowered androstephium (*Androstephium breviflorum*). Four specimens of matted cholla were observed, three in Nevada and one in California. Thirty-two rosy two-toned beardtongue individuals were observed in Nevada, none in California. Eighty-eight white-margined beardtongue plants were observed in Nevada, and none in California. Lastly, three small-flowered androstephium plants were noted in Nevada, none in California.

In addition to the four species observed pre-construction surveys and biological monitoring during construction will also consider the following sensitive plant species:

- Aven Nelson's phacelia (*Phacelia anelsoni*)
- Black grama (*Bouteloua eriopoda*)
- Borrego milkvetch (*Astragalus lentiginosus* var. *borreganus*)
- California barrel cactus (*Ferocactus cylindraceus*)
- Clark Mountain buckwheat (*Eriogonum heermanni* var. *floccosum*)
- Desert pincushion (*Escobaria vivipara* var. *deserti*)
- Mojave milkweed (*Asclepias nyctaginifolia*)
- Nine-awned pappus grass (*Enneapogon desvauxi*)
- Sky-blue phacelia (*Phacelia coerulea*)
- Utah vine milkweed (*Cynanchum utahense*)

2.3 Seed Collection

Seed may be collected from the project vicinity or procured from local vendors if derived from sources in the Project's regional vicinity (i.e., Mohave Desert within 40 miles of the Project). Collection efforts should target as many different annual and perennial species as are available during each collection session. In addition, the same species should be collected from different sites in order to maximize potential for incorporating genetic diversity and yield vegetation that is better able to adapt to changes in environmental conditions. Not all desired species may be available for collection in any particular year due to various climatic factors. Therefore, the native seed palettes mixes recommended herein provide a guide but may be varied based on actual availability of material.

Native seed collected in the field requires cleaning. Native seed should also be weed free and should be stored in cool dry conditions until ready to use Removing detritus and chaff from seed helps maintain seed vigor and health and will reduce seed bulk during storage (Vallentine 1979). A sieve screen will facilitate cleaning in the field. Pulpy seed should be dried and cleaned prior to storage. Seed must be stored in cool, dry conditions in appropriate containers and employing other appropriate storage methods to deter molding and preserve seed materials in good condition.

Table 5 lists native species recommended for collection and the approximate time of year during which seed from each species may be available and ready for collection.

Table 5. Recommended for Seed Collection: Species and Availability Periods

Perennial Plants	
Common Name ***Scientific Name*[1]**	**Availability Period**
Desert Needlegrass *Achnatherum speciosum*	May-July
Indian Rice Grass *Achnatherum hymenoides*	May-July
White Bursage, Burrobush *Ambrosia dumosa*	March-June (may also be available September to November after summer rains)
Four-wing Saltbush *Atriplex canescens*	June–September
Alkali Saltbush, Allscale, Cattle Spinach *Atriplex polycarpa*	August-October
Sweetbush *Bebbia juncea* var. *aspera*	May-August
Virgin River Brittlebush *Encelia virginensis*	May-June
Mormon Tea *Ephedra nevadensis*	April-May
Eastern Mojave Buckwheat *Eriogonum fasciculatum* var. *polifolium*	May-October
Cooper's Goldenbush[2] *Ericameria cooperi*	April-July
Cheesebush *Hymenoclea salsola*	March-June
Winterfat[2] *Krascheninnikovia lanata*	May-September
Creosote *Larrea tridentata*	April-July
Anderson's Wolfberry *Lycium andersonii*	April-June
Big Galleta *Pleuraphis rigida*	March-July
Johnson's Indigo Bush *Psorothamnus arborescens* var. *minutifolius*	May-June
Bladder Sage, Paper Bag Bush *Salazaria mexicana*	March-July
Mint Sage, Dorr's Sage *Salvia dorrii*	June-August
Desert Senna *Senna armata*	April-July
Desert Mallow, Globe Mallow *Sphaeralcea ambigua*	April-July
Turpentine Broom *Thamnosma montana*	April-June
Annual Plants[2]	

Scientific Name[1]	Availability Period
Fremont's Pincushion *Chaenactis fremontii*	April-May
Purple Desert Lupine *Lupinus shockleyi*	April-June
Desert Dandelion *Malacothrix glabrata*	April-May

[1] Plant nomenclature used in this document follows Baldwin [ed.] (2002).

[2] Annual plants may be added to the mixes as available. Three common species are suggested here.

2.4 Site Preparation

Site preparations typically involve manipulating surface material to promote seed germination and growth to will increase overall planting and seeding success and are typically necessary to address compaction, infiltration, and nutrient problems (Zink and Allen 2002). In areas where surface soils are disturbed during construction it may be necessary to alleviate resultant compaction and/or to re-contour the surface to restore natural slopes and drainage patterns. Compacted areas will be ripped, pitted, or otherwise treated to create a rough soil surface. Improving soil surface heterogeneity will promote best results from broadcast seeding and will also help reduce soil erosion and re-compaction.

2.4.1 Soil Salvage and Conservation

Soil salvage prior to disturbance and redistribution post-construction is often extremely important to promote successful site restoration as it conserves the essential ingredients of the plant community including seeds, nutrients, biotic crust microbes, mycorrhizal fungi, and organic matter over disturbed sites. The usefulness of salvaged material decreases dramatically depending on storage method and storage time (Harris et al. 1989, Visser et al. 1984). For this plan the following method will be employed subject to refinements in the field by the restoration specialist. The top four inches of soil will be recovered from grubbed sites and will be stockpiled in un-compacted piles less than three feet tall and weeded as needed.

Stockpiled soil materials should be used within three to four months of removal. However, if soils must be stockpiled and stored for periods of time greater than three months, soils can be protected from erosion and weed invasion by positioning stockpiles to minimize exposure to wind and by sowing the soil with a perennial cover crop of native bunch grasses such as big galleta, or Indian rice grass. This will also help maintain viability of soil fungi and microbial communities.

Once soils are stockpiled and seeded, the soils must not be disturbed until they are re-spread over graded or treated areas. Rocky substrates consisting of gravels and cobbles will also be recovered by scraping rocky surfaces and storing the material in piles separately from topsoil. Rocky material will be re-spread in areas of similar substrate and will serve to maintain surface heterogeneity and to provide seed "traps".

2.4.2 Plant Conservation (Vertical Mulch)

Vertical mulch, including natural organic debris such as shrubs, creosote branches, Joshua tree limbs, and other plant material will be salvaged from areas where surface soils are expected to be mechanically disturbed (e.g., graded or contoured). The salvaged materials will be stockpiled near impact locations and will be used for "vertical mulch" in substantially disturbed areas post-construction to promote reclamation.

Applying "vertical mulch" typically involves inserting pieces of native vegetation such as, sticks, branches upright in the soil to create a grid-like pattern. It is apparent that vertical mulching "may be more effective than sheet mulch, by slowing water movement, providing open channels for water penetration into the deep soil, [providing] safe sites for seeds to catch and sprout, windbreaks to catch seed and dust, and shade and cover for seedlings, and providing a source of below ground organic matter to help return the soil ecosystem to health" (Bainbridge 2007). The use of vertical mulching to help stabilize soils and promote revegetation, particularly seed germination and growth, would primarily be applied in discrete areas where soils have been disturbed (e.g., disturbance level D-3), since these areas will generally be seeded. Thus vertical mulch will be applied to increase site heterogeneity, provide shelter for seeds and seedlings, and provide habitat for rodents, reptiles, and other wildlife species. Moreover, when combined with boulders and plants, vertical mulching will form a natural physical barrier to closed sites and to deter unauthorized use of temporary access roads. The Department of Defense and the Bureau of Land Management elsewhere in the Mojave Desert have effectively employed this method of restoration and road closure (Tetra Tech 2007; Tetra Tech 2003; Egan 2000).

Vertical mulch application will be conducted in conjunction with or immediately following other restoration methods and will be reserved for those areas where soil stabilization is a concern. One particular example of vertical mulching that will be implemented as part of the EITP restoration effort involves the use of unsalvageable yucca and cacti as vertical mulch materials. Since it will not be practical to salvage all specimens of cacti and yucca from impacted areas, specimens that are too large or in too fragile a condition to salvage can be used for vertical mulching. Unsalvageable specimens may be disarticulated (i.e., taken apart) and main stems and branches inserted vertically into holes excavated with a hand augur or post-hole digger, or other appropriate tools. Larger sections and stems may need to be installed up to 2 feet deep to prevent them from being pushed over by strong winds.

In addition, sticks and branches from other woody and semi-woody desert shrubs that are crushed or broken in impacted areas would also be available for use as vertical mulch. Also, in areas where little vegetative debris is available from impacted areas, it may also be appropriate to procure and install other organic materials such as rice straw to supplement available natural materials.

2.5 Seeding and Native Seed Mixes

Areas subjected to Disturbance levels 1 or 2 are not proposed to be seeded unless special conditions are exhibited. However, seed will be applied at discrete restoration sites exhibiting significant soil disturbance (D-3 level of disturbance) and/or grading and in areas specifically designated at the time of the Initial Conditions Site Assessment as requiring seed due one or more prevailing conditions such as a lack of any viable seed in the disturbed area. The seed mix used will depend on the surrounding native habitat type or "Zone" and shall follow the site-specific recommendations provided in Section 2.8, below. The method of application will depend on the accessibility and size of the particular area and whether areas are subject to soil stabilization requirements under an approved Storm Water Pollution Prevention Plan (SWPPP). Large, easily accessible areas may be imprinted when appropriate soils conditions exist or may be hydroseeded with a Stabilizing Fiber Matrix (SFM) or Bonded Fiber Matrix (BFM) application to provide for both seed application and SWPPP compliance. Small, remote, and/or inaccessible areas will be hand seeded.

Seeding will occur in the fall or winter (e.g., October 15 to February 1) following construction-related grubbing and clearing. Native seed mixes will follow the recommended seed mix ratios presented in Section 2.6 as closely as is practical. The species composition may change if seed sources are not found. The ratios may also be refined based on the results of field surveys and site-specific observations.

2.5.1 Imprinting

Imprinting is the preferred method for revegetation of large areas when soils are neither too loose nor too compacted. In appropriate soils, imprinting ensures successful establishment of seed into the soil and eliminates the need for mulch, soil irrigation, and soil binding. Imprinting also increases rainwater infiltration, improves gas exchange between soil and the atmosphere, reduces erosion, and improves contact between seeds and soil water (Barnes 1950; Gintzburger 1987; Oliveira et al. 1987; Slayback and Cable 1970). In addition, imprinting creates microsites that catch and hold wind-dispersed seed, encouraging germination and plant establishment.

Imprinting is accomplished via a mechanical imprinter that is pulled behind a tractor and simultaneously spreads and buries pre-developed seed mixes in v-shaped depressions approximately 3 to 5 inches deep (Figure 3).

Imprinting under the most normal conditions results in shrub establishment within one to three years. However, imprinting achieves the best results when accomplished at the onset of the rainy season.

For this Project, seed may be imprinted on friable soils that are likely to maintain their shape once treated. Imprinting will occur in tandem with other restoration techniques to replace and restore a native seed bank in disturbed soil in large areas and within long linear impacts.

Figure 3. Tractor pulling imprinter

2.5.2 Hand Seeding

Hand seeding will be used where imprinting is deemed infeasible due to substrate, location, or disturbance area size. In general, application of hand-broadcasted seed will be reserved for areas generally 0.5-acre or less in size. Hand seeded sites will be raked or harrowed before seeding to break up the surface and after to allow seeds to fall into crevices. This will also help retain moisture for germination. The seed material may be broadcast by hand or using a seed spreader. Hand seeding will be timed to occur in the late fall prior to rains. Areas slated for hand seeding will be scheduled to have twice the amount of seed as areas slated for imprinting.

2.5.3 Hydroseed Applications and SWPPP Compliance

Prior to seed applications in discrete areas where soils have been substantially disturbed (e.g., average depth of displacement > 3"; total area disturbed > 2,000 square feet) the restoration contractor will coordinate with the general contractor and SCE to determine SWPPP compliance requirements for soil stabilization. Certain areas where soils must be stabilized to near pre-construction conditions may require application of SFM or BFM binders in the hydromulch mix to achieve requisite soil stabilization. It is recommended that the restoration contractor obtain copies of SWPPP requirements and also obtain specifications for both SFM and BFM types of hydromulch applications.

In those areas that require such applications, it is recommended that approximately ½ the total seed to be applied be first hand broadcast over the treatment area (unless windy conditions are prevalent) and the remainder of the seed be mixed in the tank with the hydromulch mixture. If winds would tend to blow seed away, all seed may be mixed in the tank. Either SFM or BFM applications must otherwise be applied in accordance with standard practices and manufacturer's instructions.

2.6 Conservation of Succulent Specimens

2.6.1 Salvage and Transplantation

The BLM normally requires transplanting or salvage of certain native plant species that would be lost to development on lands under their jurisdiction including: yuccas regardless of size (*Yucca* spp.), ocotillo (*Fouquieria splendens*), and cacti. For chollas, the plant must be less than 3 feet in height to require salvaging; all plants greater than three (3) feet in height may be left on site to be destroyed by clearing activities (BLM 2001). The larger chollas thus become part of natural desert mulch, which provide a seedbank for regeneration of these and other species.

Plant salvage and transplantation shall occur in the late winter or early spring, to the maximum degree practicable. SCE shall conduct focused surveys for transplantable cactus and yucca prior to construction. Disturbance areas will be surveyed following staking and marking of Project construction sites including tower sites, access roads, and staging areas, but prior to construction.

All individuals of potentially transplantable species (cactus and yuccas) will be assigned a number, marked with flagging and mapped using a GPS with at least 1-meter resolution. Only plants deemed in good health and condition will be transplanted. Prior to transplanting, a qualified biologist will ensure that the plants are free of nests and nesting birds if transplanting occurs between 15 February and 15 August. The biologist will also examine plants and surrounding areas for potential impacts to protected wildlife species. All plants with active nests or protected wildlife species will be avoided.

The transplant location for any individual plant shall be the closest area that supports suitable conditions for the species outside of impact areas but within the Project ROW. Relocation sites will attempt to match as closely as possible the slope, soil, soil texture, and other micro-habitat conditions.

These are the maximum number of yucca and cacti transplantation and salvage quantities within the maximum potential impact limits. The actual numbers will be determined during construction and it is anticipated that the actual number of specimens impacted will be considerably less than this "worst-case" scenario. The numbers of succulent specimens identified during the 2010 field surveys (AECOM 2010a) by project activity are as follows:

- Old tower removal - 369 cacti and 12 yuccas
- New towers on old tower locations – 361cacti and 34 yuccas
- New tower construction – 362 cacti and 18 yuccas
- OPGW retrofit – 380 cacti and 172 yuccas of which 102 are Joshua trees
- Laydown areas - 64 cacti and 0 yuccas

2.6.2 Salvage and Transplanting Methods

Cacti and yucca deemed suitable for transplantation will be temporarily relocated to a storage facility where they will be maintained until they are ready to be transplanted to restoration sites. Each yucca and columnar cactus (i.e., barrel cactus and Johnson's fishhook cactus) transplant will be permanently tagged on its north side (all other cactus may be tagged on any side) with a unique number prior to removal. Each transplant will be generally identified by number, species and each specimen's general dimension and GPS coordinates of removal locations will be recorded to document salvaged plants for the Project.

Although transplantation can occur at any time of the year, the optimal season for transplanting cacti and yuccas is when days begin to warm and temperatures rarely drop below 60° Fahrenheit. Periods of heavy rain should also be avoided. If transplanting must occur during colder months or during rainfall periods, additional methods may be required to ensure successful transplantation.

Only succulent specimens rated as good or fair will be transplanted. Excavation will occur in a manner that preserves as much of the transplant specimen's root mass as possible. For chollas, the plant must be less than 3 feet in height to require salvaging; all plants greater than 3 feet in height must be left on site to be destroyed by clearing activities (BLM 2001). The larger chollas thus become part of a natural desert mulch, which provides a seed source for regeneration of these species.

The following two-person method is recommended to ensure successful transplantation of hand-excavated cactus species:

1. Mark the north face of the barrel cactus, Johnson's fishhook cactus, or yucca with an aluminum tag;
2. Excavate a 12 to 18-inch trench around the target plant at 12 to 18 inches from the plant to accommodate roots;
3. Wrap the plant with a canvas tarp or other material;
4. Gently pry the plant out of the soil with a shovel, while a second person uses the tarp as a harness to prevent the plant from falling and to direct the plant to a transport (truck, trailer, etc.) for relocation;
5. Move the plant to a shady spot to prevent transplant shock, if not immediately transplanted;
6. Trim damaged roots with a disinfected knife (a 10% bleach solution is recommended);
7. Treat cactus roots with a fungicide and a bactericide, or cover the entire root mass with sulfur;
8. Conversely, if the cactus or yucca cannot be immediately planted, allow the roots to dry in a shady spot for one week;
9. Excavate a receiving hole roughly as wide and twice as deep as the hole left by the removed plant;

10. Create a small basin roughly twice the diameter of the cactus or yucca that will be used to retain water during watering events;
11. Place the transplant in the hole at its original depth and orient it the same way that it was when removed from its original location;
12. Replace the soil and firm it by applying pressure with the foot;
13. Taller plants may require staking as described below under Supplemental Techniques.

Mechanical methods may be used to excavate and transplant cactus and yuccas over six feet in height, as these are more efficient and safer than hand excavation methods for taller plants. The right machine (e.g., a small backhoe) must be used for this work, so that the entire root mass is excavated without damaging the specimen and usually often without the need to trench around the plant.

Only Joshua trees greater than three feet but less than 14 feet shall be transplanted because transplanting very large and very small specimens is typically unsuccessful. Tree spading is recommended for all Joshua trees greater than six feet tall deemed transplantable. Successful Joshua transplantation with approximately 80% survival after 10 years has been documented in the Mojave Desert (Edwards AFB) following this technique:

1. Mark the north face of the Joshua tree;
2. Excavate the accommodating hole at the permanent or temporary site using the tree spade;
3. Saturate the receiving hole with water to near capacity;
4. Recover the transplant (Joshua tree) with the tree spade;
5. Place the tree in its original orientation or approximately so;
6. Firm the soil around the transplanted Joshua tree.

2.6.2.1 Supplemental Techniques

Supplemental techniques may be necessary to ensure transplant health. The following staking technique is recommended for tall cactus:

1. Create a ring or collar around the plant made from a material that will not cut into the plant;
2. Drive at least four stakes into the ground in each of four directions from the plant;
3. Attach wire to the ring or collar and connect it to the stakes;
4. Ensure that the collar is sufficiently taut to stabilize the plant, but not overly tight;
5. Leave the support in place for at least six months.

2.7 Special Status Species Mitigation

Consistent with APM BIO-2 and APM BIO-9, avoidance of special status plants during Project implementation is the preferred method for ensuring impact minimization to such species. Project-related activities will be monitored consistent with APM BIO-5. Workers

will participate in the Worker Environmental Awareness Program (WEAP) and will be expected to comply with APM BIO-4. Permanent impacts to special status plants will be mitigated as required by MM BIO-3. Temporary impacts to sensitive plants will be mitigated through restoration as described below.

Based on the surveys conducted in Spring 2010 (AECOM 2010a, b) the proposed project is anticipated to affect up to 30 rosy two-toned beardtongue specimens at several locations along the main drainage on the east flank of the north McCullough Pass area, and at a single locality along the Eldorado–Lugo transmission line corridor.

The project may also impact up to 88 white-margined beardtongue specimens which have been observed in various places along the Project ROW in Nevada, primarily on the bajada on the west side of the McCullough Range. The project may also affect several Utah vine milkweed plants which were recorded along the proposed telecommunication line route in California just southwest of the proposed Ivanpah Substation site and directly east of Nipton.

Preconstruction surveys, as described in Section 2.2.1 will be used to refine the actual numbers and locations of plants potentially impacted by Project implementation. The surveys will also be used to determine if any previously undetected special status plant species occur within Project footprint areas.

Seeds of special status plants directly impacted by Project activities will be collected. Seed will only be collected from populations that are expected to be directly impacted by project activities. A minimum of 150% of the total specimens impacted should be propagated for transplantation in temporarily disturbed locations. Source material collection locations will be recorded with a GPS. Propagated plants shall be planted at source material locations as soon as is practical to do so (i.e., following completion of work activities and propagation of plants).

2.8 Area-specific Revegetation Recommendations

Six habitat restoration zones, each with roughly similar vegetation composition and substrates, are identified for the purposes of refining area-specific reclamation, restoration and revegetation strategies. Each of the zones, which are depicted in Figure 4 (*Habitat Restoration Reference Zones*), identifies recommended restoration activities for D-1, D-2, and D-3 type disturbances. The listed amounts of pure live seed (PLS) are calculated for imprinter use and should be doubled for hand seeding techniques.

2.8.1 Zone 1

This portion of the alignment consists of a long bajada that extends from the Clark Mountains down to Ivanpah Lake. Vegetation includes Creosote Bush Scrub and Creosote-White Bursage Scrub series. Other common perennial plants include desert

senna, cheesebush, and sweetbush. Pincushion flower, bristly fiddleneck, desert globemallow, and desert dandelion are among seasonally abundant annuals.

The following treatments are recommended for Zone 1:

- Site preparation following construction activities to include re-contouring;
- Soil salvage and re-spreading;
- Vertical mulch salvage and installation;
- Transplanting of cactus species;
- Imprinting in friable soils and larger impact areas; and
- Hand seeding at small disturbed sites.

Table 6 includes proposed seeding rates for hand seeding and imprinting.

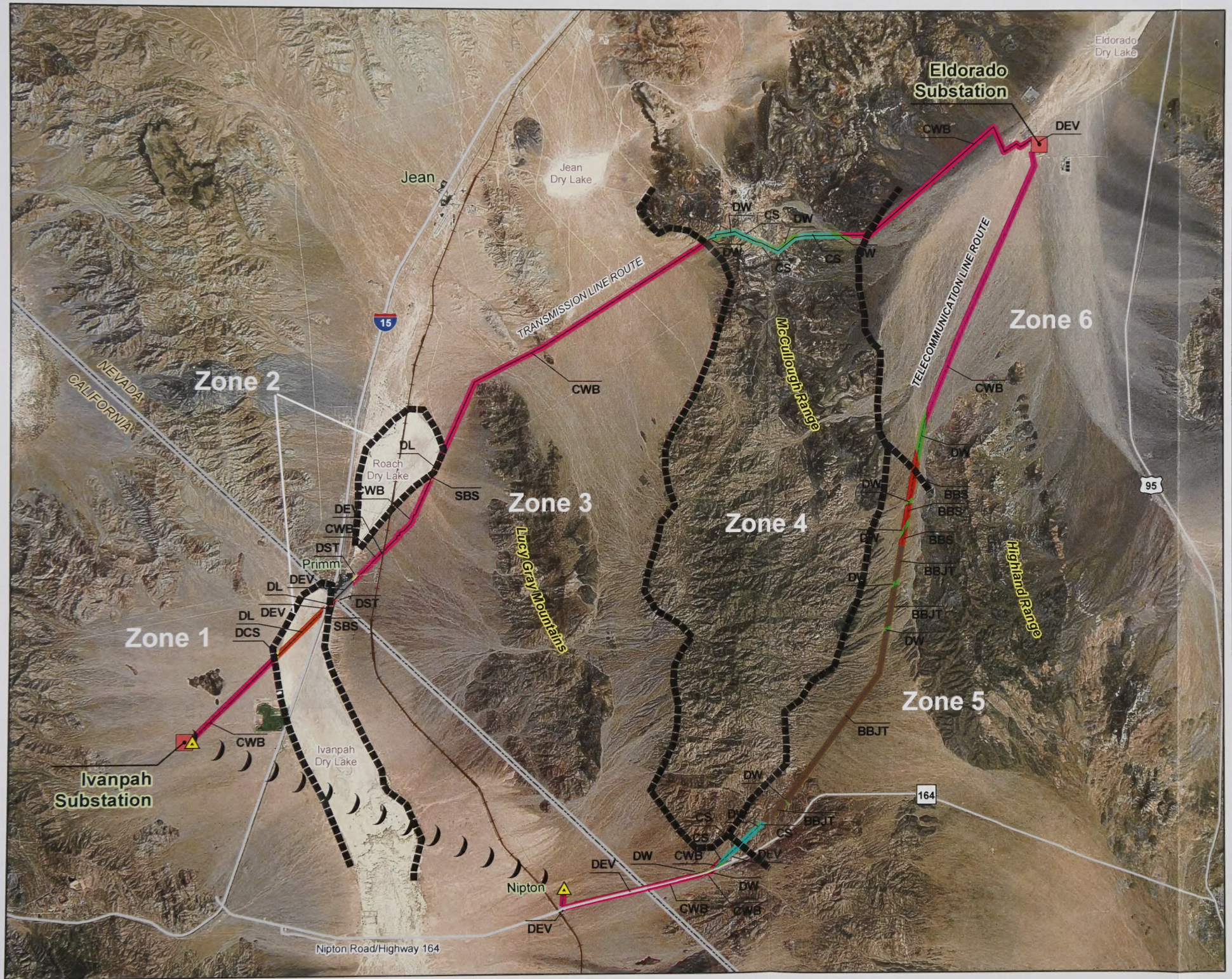
Table 6. Proposed Zone 1 Seed Mix

Proposed Seed Mix	
Common Name ***Scientific Name***	**Pounds PLS/Acre[1]**
Desert Needlegrass *Achnatherum speciosum*	4
White Bursage, Burrobush *Ambrosia dumosa*	2
Sweetbush *Bebbia juncea* var. *aspera*	0.1
Cheesebush *Hymenoclea salsola*	2
Creosote *Larrea tridentata*	2
Desert Senna *Senna armata*	2

[1] Amounts should be doubled for hand seeding.

Eldorado-Ivanpah Transmission Project
Reclamation, Restoration and Revegetation Plan

Figure 4
Habitat Restoration Reference Zones

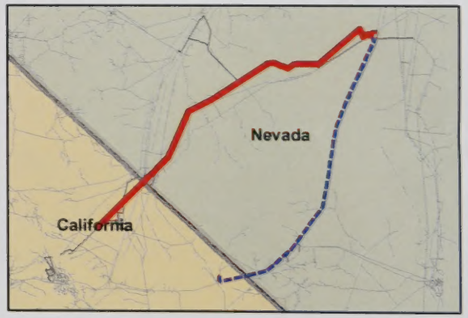


LEGEND

- Habitat Restoration Reference Zones
- Substations
- Microwave Tower
- Black Bush Scrub, (BBS)
- Black Bush Scrub-Joshua Tree Woodland, (BBJT)
- Black Bush-Juniper Scrub, (BBJS)
- Creosote Scrub, (CS)
- Creosote-White Bursage Scrub, (CWB)
- Desert Wash, (DW)
- Developed, (DEV)
- Disturbed Creosote Scrub, (DCS)
- Disturbed, (DST)
- Dry Lake Bed, (DL)
- Pinon Pine-Juniper, (PPJ)
- Saltbush Scrub, (SBS)
- Transmission Line Route
- Telecommunication Line Route
- Railroads
- Streets/Highways
- State Boundary
- Microwave Signal

0 2 4 Miles

1:180,000 1 inch = 15,000 feet



SCE Corp Environment, Health & Safety
Eldorado-Ivanpah Transmission Project
Projection: NAD 83 UTM Zone 11N
Date: 7/13/2011

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2.8.2 Zone 2

Zone 2 includes vegetation within and along the margins of Ivanpah Dry Lake. The vegetation here is dominated by a mix of saltbush species, including four-winged saltbush (*Atriplex canescens*) and allscale (*Atriplex polycarpa*).

The following treatments are recommended for Zone 2:

- Site preparation following construction activities to include re-contouring;
- Soil salvage and re-spreading;
- Vertical mulch salvage and installation;
- Imprinting in friable soils and larger impact areas; and
- Hand seeding at small disturbed sites.

Table 7 includes proposed seeding ratios for hand seeding and imprinting.

Table 7. Proposed Zone 2 Seed Mix

Proposed Seed Mix	
Common Name ***Scientific Name***	**Pounds PLS/Acre[1]**
Four-wing Saltbush *Atriplex canescens*	4
Allscale *Atriplex polycarpa*	4
Big Galleta *Pleuraphis rigida*	2

[1] Amounts should be doubled for Hand Seeding

2.8.3 Zone 3

Zone 3 consists of a series of broad sandy alluvial fans where Creosote Bush-White Bursage series vegetation grows with all-scale and, on sandier soils, big galleta grass. Mojave yucca (*Yucca schidigera*), silver cholla (*Cylindropuntia echinocarpa*), beavertail cactus (*Opuntia basilaris*), Engelmann's hedgehog cactus (*Echinocereus engelmannii*), ephedra, and cheesebush also occur in this zone.

The following treatments are recommended for Zone 3:

- Site preparation following construction activities to include re-contouring;
- Soil salvage and re-spreading;
- Vertical mulch salvage and installation;
- Transplanting of cactus and yucca species;
- Imprinting in friable soils and larger impact areas; and
- Hand seeding at small disturbed sites.

Table 8 includes proposed seeding rates for hand seeding and imprinting.

Table 8. Proposed Zone 3 Seed Mix

Proposed Seed Mix	
Common Name ***Scientific Name***	**Pounds PLS/Acre[1]**
Desert Needlegrass *Achnatherum speciosum*	4
White Bursage, Burrobush *Ambrosia dumosa**	2
Four-wing Saltbush *Atriplex canescens**	2
Allscale *Atriplex polycarpa**	2
Sweetbush *Bebbia juncea* var. *aspera*	0.1
Mormon Tea *Ephedra nevadensis*	1
Cheesebush *Hymenoclea salsola*	2
Creosote *Larrea tridentata*	2
Big Galleta *Pleuraphis rigida**	3
Desert Senna *Senna armata*	2

* As deemed appropriate for individual sites.
[1]Amounts should be doubled for Hand Seeding.

2.8.4 Zone 4

Zone 4 consists of rough terrain with rocky soils and desert washes. The vegetation series present include Creosote Bush Scrub and Desert Wash Series. Desert washes support ephedra, cheesebush, sweetbush and widely scattered catclaw acacia. Canyon bottoms also support wolfberry, Virgin River brittlebush, and California buckwheat.

The following treatments are recommended for Zone 4:

- Site preparation following construction activities to include re-contouring;
- Soil and rock salvage and re-spreading;
- Vertical mulch salvage and installation;
- Catclaw acacia plantings (to match natural density of disturbed areas as determined during pre-construction surveys);
- Transplanting of cactus and yucca species; and,
- Hand seeding.

Table 9 presents a proposed seed mix for Zone 4.

Table 9. Proposed Zone 4 Seed Mix

Proposed Hand Seeding Mix	
Common Name ***Scientific Name***	**Pounds PLS/Acre[1]**
Sweetbush *Bebbia juncea* var. *aspera*	0.2
Virginia River Brittlebush *Encelia virginiensis*	4
Mormon Tea *Ephedra nevadensis*	1
Eastern Mojave Buckwheat *Eriogonum fasciculatum* var. *polifolium*	4
Cheesebush *Hymenoclea salsola*	4
Creosote *Larrea tridentata*	4
Anderson's Wolfberry *Lycium andersonii*	1
Desert Senna *Senna armata*	4

[1]Amounts should be doubled for Hand Seeding.

2.8.5 Zone 5

Zone 5 is located in the McCullough Range and consists of Black Brush Scrub. This portion of the project ROW will support a new fiber optic communications line for the project; the existing ground wire on the transmission line will be replaced with an optical ground wire (OPGW). Shrubby vegetation, including ephedra, Virgin River brittlebush, mint sage (*Salvia dorrii*), Mojave indigobush (*Psorothamnus arborescens*), Mexican bladdersage, and Mojave yucca are common. White bursage and catclaw acacia are common along washes. Cactus species are few, with the most common being Wiggins' cholla (*Cylindropuntia echinocarpa*), and California barrel cactus (*Ferocactus cylindraceus*).

Most of the disturbance on this portion of the project ROW will be temporary in nature, with the anticipated project activities expected to be limited to primarily drive and crush type disturbance. Consequently, the following measures are recommended:

- Cactus and yucca transplantation;
- Site re-contouring, removal of tracks, and installation of vertical mulch (if deemed necessary),
- Soil surface stabilization,
- Hand seeding (if deemed necessary).

Table 10 presents a proposed seed mix for Zone 5.

Table 10. Proposed Zone 5 Seed Mix

Proposed Hand Seeding Mix	
Common Name *Scientific Name*	**Pounds PLS/Acre[1]**
Desert Needlegrass *Achnatherum speciosum*	8
Burrobush, White Bursage *Ambrosia dumosa**	2
Virginia River Brittlebush *Encelia virginiensis*	4
Mormon Tea *Ephedra nevadensis*	1
Cooper's Goldenbush *Ericameria cooperi*	4
Anderson's Wolfberry *Lycium andersonii*	1
Big Galleta *Pleuraphis rigida*	8
Johnson's Indigo Bush *Psorothamnus arborescens* var. *minutifolius*	4
Paperbag Bush *Salazaria mexicana*	4
Mint Sage, Dorr's Sage *Salvia dorii*	2
Turpentine Broom *Thamnosma montana*	2

* As deemed appropriate for individual sites.
[1]Amounts should be doubled for Hand Seeding.

2.8.6 Zone 6

Zone 6 is in the Eldorado Valley, and extends from the McCullough Range east to the Eldorado Substation. The dominant vegetation series is Creosote Bush-White Bursage. The vegetation is dominated by creosote bush with common shrubs that are sometimes co-dominant. These include four-wing saltbush, all-scale, desert senna, cheesebush and sweetbush, among others.

The following treatments are recommended for Zone 6:

- Site preparation following construction activities to include re-contouring;
- Soil and rock salvage and re-spreading;
- Vertical mulch salvage and installation;
- Transplanting of cactus and yucca species;
- Imprinting in friable soils and larger impact areas; and
- Hand seeding at small disturbed and rocky sites.

Additionally, proposed telecommunications line installation may result in drive and crush impacts that may be ameliorated by the following actions:

- Site re-contouring, removal of tracks, and installation of vertical mulch (if deemed necessary),
- Soil surface stabilization,
- Hand seeding (if deemed necessary).

Table 11 includes proposed seeding ratios for hand seeding and imprinting.

Table 11. Proposed Zone 6 Seed Mix

Proposed Seed Mix	
Common Name ***Scientific Name***	**Pounds PLS/Acre[1]**
Desert Needlegrass *Achnatherum speciosum*	4
Burrobush, White Bursage *Ambrosia dumosa**	2
Four-wing Saltbush *Atriplex canescens**	2
Allscale *Atriplex polycarpa**	2
Sweetbush *Bebbia juncea* var. *aspera*	0.1
Mormon Tea *Ephedra nevadensis*	1
Cheesebush *Hymenoclea salsola*	2
Creosote *Larrea tridentata*	2
Big Galleta *Pleuraphis rigida**	3
Desert Senna *Senna armata*	2

* As deemed appropriate for individual sites.
[1]Amounts should be doubled for Hand Seeding.

3 MAINTENANCE

3.1 Transplants (Salvaged Plants)

Transplanted shrubs will be monitored and maintained for a period of five years. This will include appropriate pruning, bracing, shading, watering for at least the first two years, and replacement as deemed appropriate.

3.2 Special Status Species

Specials status species will be monitored and maintained for a period of five years commencing with initial seeding, planting or transplanting propagules of each species. Temporary snow fencing may be erected around sensitive plant restoration sites for protection and visibility. The fencing will provide a minimum 10-foot buffer from the edge of the fence to the closest planting. Special status species restoration sites will be visited at least quarterly to inspect and repair fencing. Additional visits would occur during the growing season to determine the need for (or to perform) supplemental irrigation or weed control.

3.3 Weedy Species of Concern

A separate Invasive Species Management Plan, as required under MM BIO-4, has been prepared for the EITP. The plan is modeled on the BLM Las Vegas Office DRAFT Weed Plan. The noxious weedy plant species considered under that plan are included on lists of invasive and noxious weeds maintained and updated by the U.S. Department of Agriculture (USDA; USDA 2010), the Nevada Department of Agriculture (NDA 2005), and the California Invasive Plant Council (CIPC; CIPC 2006). The BLM also maintains their own list of weeds of special concern. Invasive plant species pose a threat to native plant communities because they can rapidly displace native plant species resulting in reduced habitat value. Twelve species found along the EITP alignment meet the criteria for inclusion on one or more of the weed lists discussed above.

Red brome (*Bromus madritensis* var. *rubens*), red-stemmed filaree (*Erodium cicutarium*), African mustard (*Malcolmia africana*), Russian thistle (*Salsola tragus*), Mediterranean grass (*Schismus barbatus*), and saltcedar (*Tamarix ramosissima*) occur within the alignment in both California and Nevada. Unique to the portions of the alignment in California are slender wild oat (*Avena fatua*), cheatgrass (*Bromus tectorum*), and Chilean chess (*Bromus trinii*), while Bermuda grass (*Cynodon dactylon*) and London rocket (*Sisymbrium irio*) are unique to Nevada. Asian mustard (*Brassica tournefortii*) may occur as well. Table 12 lists the major weedy species of concern that occur in the EITP ROW.

Table 12. Weedy Species of Concern

Common Name	Scientific Name	Recommendation	Portion of EITP Alignment
Wild oat	*Avena fatua*	Control	CA
Asian mustard	*Brassica tournefortii*	Eradicate	CA & NV
Bermuda grass	*Cynodon dactylon*	Control	NV
Russian thistle	*Salsola tragus*	Eradicate	CA & NV
London rocket	*Sysimbrium irio*	Control	NV
Salt cedar	*Tamarix ramosissima*	Eradicate	CA& NV

While certain weedy species such as red-stemmed filaree, red brome, and Mediterranean grass are abundant beyond the point of feasible control, other species such as mustard and salt cedar may spread into newly-treated areas and pose a potential threat to native species recovery.

3.4 Weed Control

The localized presence of pervasive Russian thistle, mustards, and grasses normally indicates more severe disturbance and a potential source of invasive plants for adjacent natural areas. There are two methods of removing these weeds: manually and through the use of herbicides. Employing a combination of these two methods normally yields the best results. However, foliar herbicide application is not expected to be allowed in areas where Desert tortoise may be present. Limited use of herbicides involving direct applications on specimens of noxious invasive species such as Salt cedar may be acceptable but, in general, herbicides are not proposed for use by SCE contractors for this project in areas where tortoise may occur.

Manual removal may be the optimal means of controlling weeds on small discrete sites such as roads and transplant locations addressed in this Plan. With manual removal, it is essential that it be timed prior to the production of seed. The most ideal time to do this would be when the plants have flowered, but prior to dropping their seeds. Grasses can be controlled by simply removing the flower heads. Mustards must be removed entirely, ideally removing the root as well. Since mustards can form a taproot, this can be challenging. Mowing the site is not recommended because if not removed entirely, mustards will re-sprout more vigorously from the basal rosette, thus increasing the number of flower heads and seeds. Mustards, Russian thistle, and even small tamarisk can be removed using a weed wrench. Application of these techniques is recommended as part of treatment site routine maintenance.

4 MONITORING

4.1 Performance Criteria Objectives

4.1.1 Succulent Transplantation Objectives

Transplantation is required to comply with state law and agency guidelines. The intent of transplanting cactus and yucca specimens is to protect these species from project related losses. The success criteria for transplanted cactus and yucca species shall be 80 percent survival at five years following relocation of mature plants rated in good condition at the time of transplantation.

4.1.2 General Restoration Objectives

Passive restoration involving allowing the vegetation to become reestablished naturally from intact root crowns and seed retained in the soil should provide indicators of progress as described below. In areas where disturbance is more substantial, seed applications may be necessary to promote initial establishment of native vegetation.

In either case, the intent of this program is to promote revegetation through natural successional processes. Due to the slow-growing nature of most endemic plant species in the Mohave Desert and the variability of seasonal or annual precipitation it is not reasonable to anticipate native communities to redevelop within a few short years. The main goal of restoration is for the treated areas to exhibit evidence of development of a trend of increasing native vegetative cover, diversity, and species dominance that is similar to the naturally occurring habitat in adjacent areas of the project. Specific performance standards may be waived by the appropriate agencies when monitoring indicates good growth toward a functional habitat or when all reasonable corrective actions have been identified and implemented.

Therefore, the recommended performance criteria for passive restoration areas as well as seeded sites are as follows:

- Germination and growth of a variety of seeded plant species;
- Lack of significant erosion;
- Presence of young shoots for seeded species;
- Evidence of resistance to invasion by non-native species (25% maximum weed cover at five years);
- Evidence of wildlife use (habitat value);
- 40 percent of natural cover of native perennial shrubs at the end of five years (natural cover would be determined by comparing transects in treated areas to appropriate local reference sites with the same surface soils, aspect and vegetation);

- At least 50% of the total number of dominant species observed in reference sites shall be represented in revegetated sites; and
- Recruitment of native plant seedlings within replanted areas.

4.1.3 Special Status Species

Special status species restoration areas will be monitored following initial planting for a period of five years from Project construction/implementation. Annual counts will be conducted and condition of specimens noted. The results of these counts and analysis and will be reported annually to regulatory agencies.

The performance criteria for special status species restored will be survival of at least as many individual specimens equivalent to the number of impacted individuals at the end of 5 years.

4.2 Progress Monitoring

Progress monitoring and performance assessments will be conducted by the Restoration Monitor. After initial seeding and transplanting is accomplished, for the first three full years, the revegetation areas will be inspected once monthly from February through June and bi-monthly from July through January. After the third year and until the performance standards are achieved, the site will be inspected at least every other month from December through June and at least once again in October/November.

4.2.1 Monitoring Transplanted Succulents

Standardized forms will be developed to monitor transplanted succulents. Monitors shall record plant overall health (good, fair, poor, dead), the presence of weeds, and provide recommendations for remedial measures such as more frequent irrigation or supplemental protective measures. Transplanted specimens will be monitored on a weekly basis for at least the first month following initial installation and then on a monthly basis through July in the first year, then bi-monthly through January. This will allow monitors the opportunity to identify remedial measures and provide instructions to maintenance crews. Transplants will then be monitored annually after the first full year.

Maintenance monitoring will be performed beginning immediately after installation of the transplants. Initial Monitoring Reports (IMR) will then be prepared and submitted to SCE, on the following week, due on Friday describing the conditions upon completion of the reclamation, restoration and revegetation effort for each week. Subsequent reports will follow the schedule below regarding Quarterly Monitoring Reports. The IMR shall include a description of methods used, transplantation dates, number of transplants, corresponding ID numbers, health of each transplant, maps that depict the location of each plant. Representative photographs of plant specimens will be provided in the

document, as necessary and other associated activities associated with restoration and revegetation.

4.2.2 Monitoring General Restoration Areas

Quantitative Method - Transects

A line-intercept transect method will be used to quantitatively evaluate vegetative cover and measure species composition in large treatment areas. This method is used primarily to calculate canopy cover of the vegetative part of the plant over the ground.

This method involves stretching a transect tape between two points fifty feet apart. A surveyor next walks along the transect line and measures the horizontal linear length of each plant intercepting the tape. This is done by recording the distance from canopy start to end for each species. Grasses and forbs are measured at ground level. The total distance for each species is then divided by the distance of the tape for the percent cover for that species. Gaps of less than 2 inches are generally disregarded and dead plants are not counted. Species composition is calculated by totaling the percent cover for each species. Line-intercept methods require establishing a transect by stretching a tape measure between two points that are 50 feet apart. A surveyor walks along the transect line and measures the length of each plant canopy under the transect tape. The intercept distances of grasses and forbs are measured at ground level. The total distance for each species is then divided by the distance of the tape measure to calculate the percent cover for each species. Gaps of less than 2 inches are generally disregarded and dead plants are not counted. Species composition is then calculated by totaling the percent cover for each species.

Discrete areas 1.0 acre or larger will be sampled with 4 transects each 50 feet in length. Restoration areas of 0.5 acre or more but less than 1.0 acre will be sampled with 2 transects each 50 feet long. Two control transects will also be examined in a reference site corresponding to the same habitat type and approximate slope aspect examined in one or more large treatment areas. The control transects will be placed in undisturbed habitat as close to the test transects as possible. Transect surveys will be conducted bi-annually in the late spring or early summer. Subsequent surveys will be conducted using the same methodology and along permanent transect lines to verify consistent comparisons among years. Transects will be permanently marked and mapped using a GPS device. Where the treatment area size is too small to accommodate transects, then a visual estimate of density will be used in its stead, as described in the next subsection.

Qualitative Method – Visual Estimates

Many of the discrete areas disturbed by construction of the EITP will be smaller than 0.5 acre (approx. 22,500 square feet). Vegetative cover and composition will be visually estimated and separately reported for all sites smaller than 0.5 acre and larger than

about 2,500 square feet. Visual estimates will involve walking meandering transects through the subject plot, noting species presence and composition as well as making general observations from at least two vantage points outside the subject plot to estimate cover values. Visual estimates should be compared by the observer to large plots for which transect values were computed to gain an accurate perspective of coverage values.

Likewise, many of the restored temporary disturbance areas will be smaller than 2,500 square feet. Sampling each of these areas will be time consuming and is unlikely to provide useful additional information. In cases where a number of sites less than 2,500 square feet occur in the same vegetation type, a subset of the similar sites will be sample. The samples sites will comprise at least 20% of the total aggregate area of the pooled sites.

4.3 Progress Reports

Monitoring results will be recorded and included in the annual monitoring reports submitted to SCE and the BLM. Documentation will include the following:

4.3.1 "As Built" Report - Recording the Initial Restoration Effort

Upon completion of Project reclamation efforts including seeding and succulent re-planting, the Restoration Monitor (RM) shall prepare an "As-Built Report" to document the implementation of the site preparations, planting and seeding. This report shall describe the site preparation methods used, species and quantities of seed applied, seeding methods, and provide exhibits depicting the location of all discrete treatment areas. More than one "As Built" report may be prepared if the Project is completed in segments. Likewise, one or more initial transplant completion reports may be separately prepared to document succulent transplanting, including the numbers and locations of specimens of each species planted compared with the number originally salvaged and the mapped locations of removals. Significant deviations from this plan will be described and explained, particularly with respect to site preparation activities and seed materials actually collected and applied. This document(s) will be submitted to the BLM to confirm initial installation and commencement of the maintenance and monitoring phase.

4.3.2 Year One Monitoring Report

During the first year, monitoring will be conducted at least monthly from February through June and at least bi-monthly from July through January. Observations will be recorded and actions recommended to the Restoration Contractor as needed. By the end of the first January following initial plant installation, an annual progress report summarizing monitoring results will be prepared and distributed by the RM. The report will summarize maintenance activities, document progress of vegetation development and performance and recommend corrective measures if deficiencies are observed.

4.3.3 Year Two through Five Monitoring Report

After the first full year, site inspections will be performed by the RM at least bi-monthly from February through July (minimum of 3 visits to all sites), with at least one more inspection from July through January. By the end of January, following each subsequent year an annual report describing the site's progress and the results of the monitoring efforts for each year will be submitted to BLM. A final report will be prepared and submitted to the BLM after the completion of five years of monitoring of the transplanted succulent specimens to document the results of that replacement program.

Annual reports for the general revegetation effort will be prepared by the end of January following years two through five and will describe observed features including qualitative estimates of species cover and survivorship, success or failure rates of seeded species, growth of perennial species, and will also include quantitative measurements of the total vegetative cover and relative coverage by native species in large areas (i.e., > 0.5 acre) where transects are used. Cover values will be determined both by general inspection and by direct sampling using the line-intercept transect procedures described above. Maintenance efforts, challenges encountered, and the general condition and health of the developing vegetation will also be noted in each annual report. Photographs taken from each photo station (as noted below) will provide visual records of the progress within selected treatment areas. Recommendations and schedules for corrective measures will be identified and described.

4.3.4 Photo Documentation

The Restoration Monitor will establish an initial set of permanent photo points on the project site. These points will be permanently marked with stakes and mapped using a GPS. Photo points will be selected to provide a representative view of various habitat types and disturbance levels experienced. At least 16 photo points are recommended to show at least 4 different views of the 4 most prevalent habitat types but many more points of interest may also be photographed to provide comparisons of revegetation progress over time. Photo points will be visited and photographed annually during the spring and at the height of the flowering season for most species.

4.4 Contingency

Cacti and yucca transplants lost within the first two years will be replaced with supplemental plants from nearby disturbance sites or nursery stock. Dead plants will not be removed, but will be left in place as vertical mulch and recovered plants will be planted adjacent to or near the dead plant.

Seedlings may also be used as supplemental plantings if 80 percent survivorship (as described in Section 4.1.1) is not observed and sufficient replacement plantings are not available to offset losses.

SCE will implement remedial seedling planting based on a size class roughly equal to six seedlings per plant deemed in good condition at the time of planting and three seedlings per plant deemed in poor condition at the time of planting. The same species will be used in the vicinity of the original planting in similar soil conditions.

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APPENDIX A

Relevant Mitigation Measures

Mitigation Measure	Description
Applicant Proposed Measures (APMs)	
APM BIO-2: Minimize Vegetation Impacts	Every effort would be made to minimize vegetation removal and permanent loss at construction sites. If necessary, native vegetation would be flagged for avoidance.
APM BIO-4: Best Management Practices	Crews would be directed to use Best Management Practices (BMPs) where applicable. These measures would be identified prior to construction and incorporated into the construction operations.
APM BIO-5: Biological Monitors	Biological monitors would be assigned to the project in areas of sensitive biological resources. The monitors would be responsible for ensuring that impacts on special-status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors would flag the boundaries of areas where activities would need to be restricted in order to protect native plants and wildlife or special status species. Those restricted areas would be monitored to ensure their protection during construction
APM BIO-6: Worker Environmental Awareness Program	A Worker Environmental Awareness Program (WEAP) would be prepared. All construction crews and contractors would be required to participate in WEAP training prior to starting work on the project. The WEAP training would include a review of the special-status species and other sensitive resources that could exist in the project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained
APM BIO-9: Facility Siting	Final tower and spur road locations would be adjusted to avoid sensitive biological resources to the greatest extent feasible.
APM BIO-10	An invasive plant management plan would be developed to reduce the potential for spreading invasive plant species during construction activities
Mitigation Measures (MMs)	
MM BIO-1: Preconstruction Surveys	Preconstruction surveys will be conducted by USFWS-approved biologists according to the most current USFWS protocols, where available by species. These surveys will include surveying brush clearing areas and ground disturbance areas within habitat deemed suitable for sensitive species by a qualified biologist. As part of the pre-construction surveys, the composition of the vegetation community will be surveyed to establish baseline conditions prior to construction for post-construction restoration efforts. These surveys will be conducted for the presence of special-status plants, the presence of noxious weeds, and the presence of general and special-status wildlife species, to prevent direct loss of vegetation and wildlife and to prevent the spread of noxious plant species. For the noxious weeds survey, the level of effort and extent of the surveys will be outlined by the Invasive Plant Management Plan.
MM BIO-2: Reclamation Plan	The applicant will develop a Reclamation, Restoration, and Revegetation Plan (RRRP) prior to adoption of the Final EIR/EIS that will guide restoration and revegetation activities for all disturbed lands associated with construction of the project and the eventual termination and decommissioning of the project. The RRRP will be

Mitigation Measure	Description
	part of the applicant's final Plan of Development for the project and should address all federal and private land disturbances including areas where restoration activities have been funded by the Clark County MSHCP and initiated by resource agencies. The RRRP will be developed in consultation with appropriate agencies (BLM, CPUC, CDFG, and Clark County DCP) and be provided to these agencies for review prior to preparation of the Final EIR/EIS. NDOW and the BLM Las Vegas Field Office will be consulted for restoration efforts concerning Nevada State protected cacti and yucca species, which may include preparation of a separate Cactus and Yucca Reclamation Plan. The RRRP will also provide details including but not limited to topsoil segregation and conservation, vegetation treatment and removal, salvage of succulent species, revegetation methods including seed mixes, rates and transplants, and criteria to monitor and evaluate revegetation success. Post-construction monitoring will be performed for 1 to 5 years, depending on the disturbance level and restoration level as outlined in the BLM's 2001 Restoration Plan for Energy Projects in the Las Vegas Field Office.
MM BIO-3: Special-Status Plants Restoration and Compensation	The applicant will mitigate for the loss of special-status plant species within the project area following the completion of all construction activities at a particular site and within 1 year of post-construction according to the requirements of resource agency authorizations (e.g., CDFG 2081 permit). Special-status plants will be restored by relocation of plants and/or re-seeding, replacing topsoil with existing topsoil that was removed, and re-grading to pre-existing soil contours. Measures to restore special-status plants will be implemented through the Reclamation Plan (MM BIO-2). Additionally, that plan will provide a matrix showing how the applicant will address each species considered sensitive or special-status in terms of mitigation type (e.g., seed collection, transplanting, fencing certain population, and compensation measures). The CDFG will likely require land compensation and enhancement and endowment fees for the project in addition to restoration. If special-status plant communities cannot be restored, the applicant will provide compensation if required, in consultation with appropriate agencies (USFWS, BLM, CDFG, NDOW, and CPUC). In order to ensure enforceability, documentation of consultations with all appropriate agencies will be provided to the CPUC (the CEQA lead agency).
MM BIO-4: Model Invasive Plant Management Plan on the BLM Las Vegas Office DRAFT Weed Plan	The Invasive Plant Management Plan to be developed (APM BIO-10) will be modeled on the BLM Las Vegas Office DRAFT Weed Plan. The plan will include operation and maintenance activities, as well as construction activities. The content of the plan will include results of the noxious weed inventory, identification of problem areas, preventative measures, treatment methods, agency-specific requirements, monitoring requirements, and herbicide treatment protocol. The plan will include best management practices that require that any biological materials brought on-site (e.g., hay bales that may be used for controlling stormwater under APM GEO-2, and native [seed] mixes in MM BIO-2 will be certified weed-free. The plan will be submitted to both the California and the Nevada resource agencies and to the CPUC for approval prior to construction authorization.

APPENDIX B

Vegetation Types found in the EITP Project Area

Vegetation Type	Description
Black Bush Scrub	Black Bush Scrub is typical of mid-elevation desert mountains and is dominated by black bush (*Coleogyne ramosissima*). Shrub density is generally higher than in other desert scrub communities found along the project ROW and is also comprised of ephedras (*Ephedra* spp.), turpentine broom (*Thamnosma montana*), goldenbush (*Ericameria* sp.), Mexican bladder sage (*Salazaria mexicana*), desert lupine (*Lupinus shockleyi*), freckled milkvetch (*Astragalus lentiginosus*), and desert paintbrush (*Castilleja angustifolia*).
Black Bush and Joshua Tree	Black Bush Scrub and Joshua Tree features Joshua tree (*Yucca brevifolia*) as an emergent.
Creosote Bush Scrub	Creosote Bush Scrub is dominated by creosote bush (*Larrea tridentata*). It is found in bajadas and lower elevations within the project ROW. Within this association, other shrubs such as four-wing saltbush (*Atriplex canescens*), allscale (*A. polycarpa*), desert senna (*Senna armata*), cheesebush (*Hymenoclea salsola*), and sweetbush (*Bebbia juncea*) co-occur. Annual plants, including pincushion flower (*Chaenactis fremontii*), bristly fiddleneck (*Amsinckia tessellata*), desert globemallow (*Sphaeralcea ambigua*), cryptantha (*Cryptantha* sp.), combseed (*Pectocarya* sp.), and desert dandelion (*Malacothrix glabrata*), are also seasonally abundant.
Creosote Bush-White Bursage Scrub	Creosote Bush-White Bursage Scrub features white bursage (*Ambrosia dumosa*) as a common co-dominant species.
Disturbed Creosote Scrub	Disturbed Creosote Scrub is creosote scrub that is heavily impacted by human activity.
Developed	Developed is a category that describes areas under current human use.
Dry Lake Bed	Dry Lake Bed includes Ivanpah Lake.
Disturbed	Disturbed refers to areas generally devoid of any vegetation type as a result of human activity.
Desert Wash	Desert Wash vegetation within the EITP alignments include widely scattered catclaw acacia (*Acacia greggii*) and, more commonly, ephedra, cheesebush, and sweetbush. Mesquite mistletoe (*Phoradendron californicum*) occurs in some of the catclaw acacia specimens in wash areas. Vegetation along canyon bottoms and washes in the McCullough Range is shrub-dominated, without emergent tree species. Shrubs present include catclaw acacia, wolfberry, Virgin River brittlebush, and California buckwheat (*Eriogonum fasciculatum*).
Joshua Tree Woodland	Joshua Tree Woodland occurs at middle elevations. Joshua Tree Woodland is dominated by Joshua tree (*Yucca brevifolia*) with Mojave yucca, ephedras, cheesebush, California buckwheat (*Eriogonum fasciculatum*), and wolfberry (*Lycium andersonii*) present as common sometimes co-dominant shrub species.
Saltbush Scrub	Saltbush Scrub is dominated by saltbush species (*Atriplex* spp.), white bursage, and big galleta (*Pleuraphis rigida*). Saltbush scrub occurs in alkaline soils at dry lake bed edges. Vegetation is an intermittent to open canopy, generally less than 2 feet in height.

APPENDIX C

Disturbance Acreage Tables by Project Activity and Disturbance Type

Disturbance Acreages by Project Activity and Disturbance Types

Table 1A. Transmission Route Approximate Temporary Habitat Disturbance				
Project Feature	Site Quantity	General Disturbed Acreage Calculation (L x W)	Level of Disturbance	Approximate Acres of Habitat Temporarily Disturbed
115-kV Conductor Removal and 220-kV Conductor and OPGW Stringing Setup Area — Puller (1)	23	200 feet x 150 feet	D-1	15.1
115-kV Conductor Removal and 220-kV Conductor and OPGW Stringing Setup Area - Tensioner (1)	24	500 feet x 150 feet	D-1	41.3
220-kV Conductor Splicing Setup Areas (1)	12	150 feet x 100 feet	D-1	3.8
BrightSource General Station - Material and Equipment Staging Area	1	approx. 10.00 acres	N/A	0.0
Construct New Lattice Steel Dead-End Structure (2)	35	200 feet x 200 feet	D-2	24.1
Construct New Lattice Steel Heavy Dead-End Structure (2)	3	200 feet x 200 feet	D-2	2.2
Construct New Lattice Steel Suspension Structure (2)	178	200 feet x 200 feet	D-2	124.4
Construct New Tubular Steel Double H-Frame (3)	21	200 feet x 200 feet	D-1	15.4
Gen. Sta. Yard - Material and Equipment Staging Area	1	approx. 16.52 acres	none	0.0
Guard Structures	16	50 feet x 75 feet	D-2	0.52
Helicopter Landing Zone 3	1	700 feet x 225 feet	D-2	3.6
Helicopter Landing Zone 5	1	500 feet x 500 feet	D-2	5.7
Jean, Nevada - Material and Equipment Staging Area	1	approx. 13.59 acres	none	0.0
New Access Roads (4)	1.2	linear miles x 14 feet	none	0.0
New Spur Roads (4)	1.7	linear miles x 14 feet	none	0.0
Primm Valley Casino Vacant Lot - Material and Equipment	1	approx. 28.28 acres	none	0.0
Remove Existing Lattice Steel H-frame(5	208	150 feet x 75 feet	D-1	45.3
Remove Existing Lattice Steel Structure (5)	13	150 feet x 75 feet	D-1	3.4
Remove Existing Wood H-frame(5)	23	100 feet x 75 feet	D-1	4.0
Remove Existing Wood Pole (5)	6	100 feet x 75 feet	D-1	1.0

Table 1A. Transmission Route Approximate Temporary Habitat Disturbance				
Project Feature	**Site Quantity**	**General Disturbed Acreage Calculation (L x W)**	**Level of Disturbance**	**Approximate Acres of Habitat Temporarily Disturbed**
Casino Vacant Lot - Material and Equipment Staging Area	1	approx. 3.1 acres	D-1	0.77
TOTAL TEMPORARY IMPACTS FOR TRANSMISSION ROUTE				**290.6**

Notes: Transmission route table is based the EITP Draft EIR/EIS Table 2-9 for Helicopter Landing Zones, Table 2-10 for guard structures, and Table 2-11 for transmission line project features.

(1) Based on 9,000-foot conductor reel lengths, number of circuits, and route design.

(2) Includes foundation installation, structure assembly and erection, conductor and OPGW installation; area to be restored after construction.

(3) Includes structure assembly and erection, conductor and OPGW installation; area to be restored after construction.

(4) Based on length of road in miles x road width of 14 feet. Road lengths updated based on SCE's suggested changes to the project description in the Draft EIR/EIS.

(5) Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2 feet below ground surface.

Table 1B. Telecommunications Route Approximate Temporary Habitat Disturbance				
Project Feature	**Site Quantity**	**General Disturbed Acreage Calculation (L x W)**	**Type of Disturbance**	**Approximate Acres of Habitat Temporarily Disturbed**
Telecommunications Route - Path 1 Impacts				
Underground Trench/Duct for Fiber Entrance to Eldorado Substation (1)	1	500 feet x 1.5 feet	D-3	0.02
Underground Trench/Duct for Fiber Entrance to Ivanpah Substation(1)	1	500 feet x 1.5 feet	D-3	0.02
Work Area Outside Eldorado Substation	1	40 feet x 60 feet	D-2	0.06
Work Area Outside Ivanpah Substation	1	40 feet x 60 feet	D-2	0.06
Total Temporary Disturbance				**0.16**
Telecommunications Route - Path 2 -Section 1 Impacts				
Nipton - Material and Equipment Staging Area	1	approx. 2.5 acres	D-1	0.63
OPGW Stringing Setup Area - Puller (2)	9	50 feet x 100 feet	D-1	1.00
OPGW Stringing Setup Area - Tensioner (2)	9	50 feet x 100 feet	D-1	1.00
Retrofit Existing Lattice Steel Structure (3)	45	150 feet x 150 feet	D-1	23.24

Table 1B. Telecommunications Route Approximate Temporary Habitat Disturbance				
Project Feature	**Site Quantity**	**General Disturbed Acreage Calculation (L x W)**	**Type of Disturbance**	**Approximate Acres of Habitat Temporarily Disturbed**
Total Temporary Disturbance				**25.9**
Telecommunications Route - Path 2 -Section 2 Impacts				
Work Area at 500-kV Tower M172	1	40 feet x 80 feet	D-2	0.06
Work Area for Underground Vaults and Fiber Pulling Area	6	40 feet x 60 feet	D-1	0.33
Microwave site at Nipton	1	100 feet x 100 feet	D-3	0.00
Underground Vaults(4)	4	6 feet x 6 feet	N/A	0.00
4,470 Feet Underground Fiber Cable Duct (5)(6)	1	6.8 feet x 4,470 feet	D-3	0.70
Total Temporary Disturbance				**1.09**
TOTAL TEMPORARY IMPACTS FOR TELECOMMUNICATIONS ROUTE				**27.2**

Notes: Telecommunications Table based on PEA Tables: 3-16, 3-17,and 3-18

(1) Underground trench is approximately 1.5 feet wide, at most 500 feet long from the last structure to the substation fence line.

(2) Based on 20,000 feet OPGW reel lengths, and route design.

(3) Includes structure assembly and erection, and OPGW installation: area to be restored after construction, existing portion of row within 25 feet of the lattice steel structure footings to remain cleared of vegetation.

(4) Only underground vaults for fiber optic installation between Nipton and the microwave site are included. Underground vaults along Nipton Road/Highway 164 will be installed in the disturbed road shoulder.

(5) The calculated disturbed area is based on the trench method. The proposed trench would be 1.5 feet wide; average trenching/excavating machines have a tread width of 68 inches (5.67 feet) and 14 inches (1.17 feet) of ground clearance. The applicant would select other underground construction methods to reduce land disturbance, such as horizontal boring, if feasible.

(6) Underground fiber optic cable impacts only include the 4,300 foot section to the Nipton microwave site and approximately 170 feet from tower M152 to the Nipton Road/Highway 164 road shoulder. All other trenching is located in the previously disturbed road shoulder.

Table 1C. Subtransmission Line Approximate Temporary Habitat Disturbance				
Project Feature	**Site Quantity**	**General Disturbed Acreage Calculation (L x W)**	**Level of Disturbance**	**Approximate Acres of Habitat Temporarily Disturbed**
Construct new LWS H-frame (1)(2)	6	200 feet x 100 feet	D-2	2.4
Construct new tubular steel pole (3)	3	200 feet x 100 feet	D-2	1.2
Remove existing lattice steel H-frame and construct new LWS H-frame (1)(2)	6	200 feet x 100 feet	D-2	2.4
Remove existing lattice steel H-frame and construct new TSP (1)(3)	1	200 feet x 100 feet	D-1	0.4
Total Temporary Disturbance for Subtransmission Line				**6.4**

Notes:

(1) Includes removing existing conductor, tearing down existing structure, and removing foundation 2 feet below ground surface.

(2) Includes structure assembly and erection, conductor, and shield wire installation. Area to be restored after construction. Portion of ROW within 25 feet of the LWS H-frame to remain cleared of vegetation.

(3) Includes assembling and erecting structure, installing conductor and shield wire. Area to be restored after construction. The portion of ROW within 25 feet of the TSP would remain cleared of vegetation.

Table 1D. Distribution Line Loop Approximate Temporary Habitat Disturbance

Project Feature	Site Quantity	General Disturbed Acreage Calculation (L x W)	Level of Disturbance	Approximate Acres of Habitat Temporarily Disturbed
Underground manhole installation	2	10 feet x 15 feet	D-3	0.01
Underground trench/duct for conduit(1)	1	2,600 feet x 1.5 feet	D-3	0.09
Work area for underground manholes pulling area	2	40 feet x 60 feet	D-2	0.11
Work area pulling of 3/8 mile of 1/0 ACSR(2) pole line construction	3	40 feet x 60 feet	D-1	0.17
Total Temporary Disturbance for Line Loop				**0.38**

Note:

(1) Underground trench is approximately 1.5 feet wide at most and 2,600 feet long from the existing transformer to the proposed new underground dip pole. All construction is alongside existing paved and dirt roads at the perimeter of the Primm Valley Golf Course.

(2) ACSR = Aluminum Conductor Steel Reinforced

Table 1E. Distribution Line to Nipton/Microwave Approximate Temporary Habitat Disturbance

Project Feature	Site Quantity	General Disturbed Acreage Calculation (L x W)	Level of Disturbance	Approximate Acres of Habitat Temporarily Disturbed
Install new wood poles(1)	10	25 feet x 25 feet	D-3	0.29
Work area for pulling conductor	2	40 feet x 60 feet	D-1	0.11
Total Temporary Disturbance for Line Loop				**0.40**

Note:

(1) Estimated number of wood poles for 4,300 foot overhead 12kV distribution line based on a 430 foot span similar to the existing Nipton 33kV line. Temporary impacts include 25 feet x 25 feet work area for pole installation.

APPENDIX D

Initial Conditions Site Assessment - Sample Data Form

Initial Conditions Site Assessment for Restoration Progress Monitoring

Eldorado – Ivanpah Transmission Project (EITP)

Project Segment: _____ Date _____

Nearest New Tower No. _____ or other Project Feature Name: _____

Distance and Direction from Nearest New Tower or other Project Feature: _____

Associated Construction Activity Type(s) _____

Describe Disturbance _____

_____

_____

Observed Disturbance Level(s): _____
(e.g., **D-1** = "Drive and Crush"; **D-2** = "Clear and Cut"; **D-3** = "Soil Removal")

Dimensions of Disturbed Area(s): _____
Draw Outline(s) on Other Side

Surrounding Area Plant Community:_____

_____

_____

Density of Natural Vegetation in surrounding area _____

Percent Cover by Natural Vegetation within Disturbed Area(s):_____

Assessment Method (e.g., Transect or Visual Estimate): _____

Recommended Reclamation Measures: _____

_____

_____

_____

_____

Monitoring Requirements: _____

_____

_____

_____

_____

Photograph Reference (time & date; filename, etc.): _____

Eldorado-Ivanpah Transmission Project

Invasive Plant Management Plan

SOUTHERN CALIFORNIA EDISON
Eldorado-Ivanpah Transmission Project
Weed Management Plan DRAFT
August 2010

1.0 Introduction

The purpose of this plan is to prescribe methods and procedures to prevent and control the spread of noxious weeds during and following construction of the Eldorado-Ivanpah Transmission Project (Project). Southern California Edison (SCE) and its contractors will be responsible for carrying out the methods and procedures described in this plan. The scope of this plan is geographically limited to the area within the rights-of-way (ROW) issued by the Bureau of Land Management (BLM) to SCE for construction and operation of the Project.

1.1 Goals and Objectives

Noxious weeds are defined as detrimental or destructive and difficult to control or eradicate. A noxious weed is a plant that has been defined as a pest by law or regulation. The States of California and Nevada, and the federal government maintain lists of noxious weeds. The goal of this noxious weed control plan is to implement preventive measures to minimize the spread of noxious weeds during construction and operation of the proposed facilities. Monitoring and maintenance during the construction and operational phases will include identification of areas of localized infestation on and adjacent to the Project ROW that may pose a potentially substantial risk for contributing to the spread of noxious weeds.

1.2 Project Description

The Project involves the removal of approximately 36 miles of the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115kV line and the construction of the new Eldorado-Ivanpah 220kV double-circuit transmission line, the Ivanpah substation, and associated telecommunication facilities. Based on GIS analysis of the selected transmission and telecommunication line routes, it was determined that project construction will result in up to approximately 384 acre of temporary ground disturbance impacts and up to approximately 41 acres will be permanently displaced. The majority of the Project is located within desert tortoise habitat and portions of the Project are located within U.S. Fish and Wildlife Service desert tortoise designated critical habitat, the BLM Eldorado-Piute Area of Critical Environmental Concern (ACEC) in Nevada and the Ivanpah Desert Wildlife Management Area (DWMA) in California. Although noxious weeds are not presently a concern within the majority of the Project area, there are a few localized areas where noxious weeds are present to some extent, including the areas in the near vicinity of the community of Primm, around Ivanpah Lake, Roach Lake and along Highway 164/Nipton Road. Because the project crosses through these areas there is a potential for noxious weeds to be spread by project activities.

2.0 Noxious Weed Inventory

Botanical surveys conducted in the spring of 2008, 2009 and 2010 (SCE 2009, 2010) identified twelve noxious weed species within the Project area that are on the State of California (Cal-IPC 2006) and/or State of Nevada (NDA 2005) noxious weeds lists (see Table 1). In addition to identifying noxious weed species, the botanical surveys identified and located sensitive plant species within the Project area. Vegetation communities were also identified and mapped during habitat assessment surveys.

SCE and the BLM recognize that there are species, such as red brome (*Bromus madritensis* var. *rubens*) and Mediterranean grass (*Schismus barbatus*), which have such a widespread distribution that general control of these species is not considered feasible. In addition, SCE's objective is to prevent the further spread of noxious weeds. This can require treatment in selected areas along the Project ROWs on federal lands where certain target species are problematic and form a significant

portion of the vegetation community in comparison to adjacent undisturbed areas. Repeated control measures on a Project ROW are generally not considered feasible where weed species are already established and abundant in the adjacent undisturbed areas.

The preventive measures identified below in Section 3.2 will be implemented along the Project ROW and at all of the proposed facilities and work areas on federal lands to minimize the spread of noxious weeds during construction activities.

TABLE 1
NOXIOUS WEED SPECIES DOCUMENTED IN THE PROJECT AREA

Common Name	Scientific Name	CA – CIPI Invasiveness Rating[1]	NV – Noxious Weed Category[2]	Control	Project Segment
Wild oat	*Avena fatua*	Moderate	n/a	Control	CA
Asian mustard	*Brassica tournefortii*	High	B	Eradicate	CA & NV
Red brome	*Bromus madritensis* var. *rubens*	High	n/a	Not feasible	CA & NV
Cheatgrass	*Bromus tectorum*	High	n/a	Not feasible	CA
Chilean chess	*Bromus trinii*	Not rated*	n/a	Not rated*	CA
Crossflower	*Chorispora tenella*	Limited	n/a	Not rated*	CA
Bermuda grass	*Cynodon dactylon*	Moderate	n/a	Control	NV
Redstem stork's bill	*Erodium cicutarium*	Limited	n/a	Not feasible	CA & NV
African mustard	*Malcolmia africana*	Not rated*	n/a	Not rated*	CA & NV
Russian thistle	*Salsola tragus*	Limited	n/a	Eradicate	CA & NV
Mediterranean grass	*Schismus barbatus*	Limited	n/a	Not feasible	CA & NV
London rocket	*Sisymbrium irio*	Moderate	n/a	Control	NV
Saltcedar	*Tamarix ramosissima*	High	C	Eradicate	CA & NV

*USDA listing as invasive, not rated.

[1] California Invasive Plant Council, CIPI (California Invasive Plant Inventory) Ratings:

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

[2] Nevada Department of Agriculture, Plant Industry Division, Noxious Weed List

Category "A": Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations

Category "B": Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur

Category "C": Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer

3.0 Noxious Weed Management

Noxious weed identification, spread prevention and treatment measures are described in this section.

3.1 Identification of Problem Areas

Prior to beginning construction, project areas will be surveyed for noxious weeds. Areas with noxious weeds present will be identified for noxious weed management purposes. At minimum, mapping prepared as part of the 2010 botanical survey effort, which identifies areas where noxious weed species were observed, will be utilized as a base map and updated as needed. The preventive measures outlined in section 3.2 will be used to prevent the spread of noxious weeds and to control existing noxious weed populations.

3.2 Preventive Measures

Implementation of preventive measures to control the spread of noxious weeds is the most effective management approach. SCE will provide information and training to all project personnel regarding noxious weed management, identification and potential impacts during worker environmental awareness training. The importance of preventing the spread of noxious weeds in areas not infested, and controlling the proliferation of noxious weeds already present, will be explained during the training. If noxious weeds are observed after construction commences, appropriate control measures will be utilized upon BLM approval to any areas that may be identified with noxious weed infestations, to reduce the spread or proliferation of noxious weeds.

During construction, the following preventive measures will be implemented to prevent the spread of noxious weeds:

- All vehicles and equipment will be cleaned prior to arrival at the work site using power or high-pressure equipment. Vehicle washing will concentrate on tracks, feet, or tires and on the undercarriage, with special emphasis on axles, frame, cross members, motor mounts and on underneath steps, running boards and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Crews, with construction inspector oversight, will ensure that vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots or rhizomes before the vehicles and equipment are allowed use of access roads.
- If areas of noxious weed infestation are identified after construction commences, they will be flagged in the field. The flagging will alert construction personnel and prevent access into areas until noxious weed management control measures have been implemented.
- In areas where noxious weed infestations are identified or noted in the field, cleared vegetation and salvaged topsoil will be stockpiled adjacent to the area from which they are stripped to eliminate the transport of soil-borne noxious weed seeds, roots or rhizomes. During restoration, topsoil and vegetative material from infestation sites will be returned to the areas from which they were stripped.
- If noxious weeds are identified on site, compressed air will be used to remove seeds, roots, and rhizomes from equipment before transport off site. Cleaning sites will be recorded using a Global Positioning System unit and this information will be recorded.
- Straw or hay bales used for sediment barrier installations or mulch distribution will be certified weed free and obtained from state-approved sources.
- Ground disturbance to vegetation will be limited to the absolute minimum necessary to perform the activity safely as designed. Activities that will create soil conditions that promote weed germination and establishment will be avoided whenever possible.

- Construction will begin in weed free areas whenever feasible before operating in weed-infested areas.
- Options such as area closures to regulate the flow of traffic on sites where native vegetation needs to be established will be considered and implemented whenever possible.
- Restoration of disturbed lands will be implemented immediately following construction as outlined in the Reclamation, Restoration, and Revegetation Plan. Continuing restoration efforts will promote establishment of adequate vegetative cover to inhibit the invasion of noxious weeds.
- In discrete areas where clearing and grubbing of natural vegetation will occur prior to construction, the top 3-6 inches of topsoil will be salvaged, properly stored (in piles or rows not to exceed 4' high in areas not accessible to vehicles) and replaced following construction.

3.3 Treatment Methods

SCE will implement noxious weed control measures in accordance with existing BLM regulations. In the event noxious weeds become established in the Project ROWs on federal lands after completion of construction, control measures may include one or more of the following methods:

- Treatment methods will be based on species-specific and area-specific conditions and will be coordinated with BLM.
- Manual weed removal using hand tools is the preferred control method in most circumstances. Weeds with long tap roots can be extracted using a weed wrench or sharpshooter type spade. Shallowly rooted specimens may be simply pulled by hand or removed using a spade, hoe, hand trowel or dandelion digger. It is very important to remove weeds before they mature and set seed. Weedy debris must be removed from the project area and legally disposed of off site in closed containers.
- Discing or other mechanical treatments to remove noxious weeds which substantially disturb the soil and tend to promote subsequent weed invasion are not recommended, except in extreme cases. If necessary, areas subjected to substantial sil disturbance will be treated as restoration sites and subsequent seeding will be conducted to re-establish a desirable vegetative cover to stabilize the soils and inhibit potential re-invasion of noxious weeds. Seed selection will be based on site-specific conditions as identified in the Reclamation, Restoration, and Revegetation Plan.
- Herbicide application may be used to reduce the size of noxious weed populations upon BLM approval. However, herbicide use should be avoided in areas where sensitive herbivorous species (e.g., desert tortoise) may occur. If necessary, cut-stump treatments may be performed to control tamarisk or other large woody specimens.

4.0 MONITORING

4.1 Restoration Monitoring

SCE will conduct annual monitoring for noxious weeds, in conjunction with vegetation monitoring under the Reclamation, Restoration, and Revegetation Plan. Areas of noxious weed infestations will be noted. A report containing qualitative analysis and photo documentation will be submitted annually to BLM with the Habitat Restoration Monitoring Report. Restoration areas that are anticipated to require remediation activities will be identified. General recommendations and lessons learned will be provided.

If restoration performance success standards are met within the time periods noted in the Habitat Restoration Plan, or earlier if deemed appropriate, the restored areas will be released from further monitoring. If performance success standards have not been met, negotiation with BLM for further remediation efforts will be sought at that time.

4.2 Ongoing Monitoring

Concerned parties may contact SCE to report the presence of noxious weeds within the Project ROWs. SCE will control noxious weeds on a case-by-case basis, and coordinate with BLM on treatment methods. A summary of actions taken will be provided in the next annual restoration monitoring report. SCE personnel will attend noxious weed training, provided annually by BLM, to aid in the identification of noxious weed populations, and will report spreads of noxious weeds during the normal course of maintenance.

5.0 HERBICIDE APPLICATION, HANDLING, SPILLS, AND CLEANUP

5.1 Herbicide Application and Handling

Herbicide application will only be used if dense populations of noxious weeds develop within the Project ROWs on federal lands to the extent that weed coverage will substantially interfere with achieving the success criteria established in the Reclamation, Restoration, and Revegetation Plan. Applications will be controlled to minimize the impacts on the surrounding vegetation. In areas of dense infestation, a broader application will be used and a follow-up seeding program implemented. Supplemental seeding will be based on the success criteria in the Habitat Restoration Plan. The timing of subsequent restoration efforts will be based on the life of the selected herbicide.

BLM's Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS (BLM, 2007) details which herbicide active ingredients are approved for use on public lands in the western U.S. in order to control hazardous fuels and unwanted vegetation. A Nevada BLM Pesticide Use Proposal form will be submitted by SCE prior to the use of herbicides on BLM lands and a Pesticide Application Record will be submitted after use (BLM, 2006).

- Before herbicide application, SCE or its contractor will obtain any required permits from the BLM. A licensed contractor will perform the application in accordance with applicable laws and regulations. In California, applications must be performed or supervised by someone possessing a current Qualified Applicator's License or Certificate. Applications are subject to regulations established by the California Department of Pesticide Regulation (DPR)
- All herbicide applications will follow United States Environmental Protection Agency label instructions. Application of herbicides will be suspended when any of the following conditions exists:
    - Wind velocity exceeds 6 miles per hour during application of liquids or 15 miles per hour during application of granular herbicides;
    - Snow or ice covers the foliage of noxious weeds; or
    - Precipitation is occurring or is imminent.
- Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Hand application methods (e.g., backpack spraying) that target individual plants will be used to treat small or scattered noxious weed populations in rough terrain. Calibration checks of equipment will be conducted at the beginning of spraying and periodically to ensure that proper application rates are achieved.
- Herbicides will be transported to the Project site daily with the following provisions:
    - Only the quantity needed for that day's work will be transported;

- Concentrate will be transported in approved containers only and in a manner that will prevent tipping or spilling, and in a compartment that is isolated from food, clothing, and safety equipment;
- Mixing will be done off site and at a distance greater than 200 feet from open or flowing water, wetlands or other sensitive resources. No herbicides will be applied at these areas unless authorized by appropriate regulatory agencies; and
- All herbicide equipment and containers will be inspected for leaks daily.

5.2 Herbicide Spills and Cleanup

All reasonable precautions will be taken to avoid herbicide spills. In the event of a spill, cleanup will be immediate. Contractors will keep spill kits in their vehicles and in herbicide storage areas to allow for quick and effective response to spills. Items to be included in the spill kit are:

- Protective clothing and gloves;
- Adsorptive clay, "kitty litter," or other commercial adsorbent;
- Plastic bags and bucket;
- Shovel;
- Fiber brush and screw-in handle;
- Dust pan;
- Caution tape;
- Highway flares (use on established roads only); and
- Detergent.

Response to an herbicide spill will vary with the size and location of the spill, but general procedures include:

- Traffic control;
- Dressing the clean-up team in protective clothing;
- Stopping the leaks;
- Containing the spilled material;
- Cleaning up and removing the spilled herbicide and contaminated adsorptive material and soil; and
- Transporting the spilled herbicide and contaminated material to an authorized disposal site.

5.3 Worker Safety and Spill Reporting

All herbicide contractors will obtain and have readily available copies of the appropriate material safety data sheets for the herbicides used. All herbicide spills will be reported in accordance with applicable laws and requirements.

6.0 References

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Eldorado-Ivanpah Transmission Project

Mitigation Monitoring for Affected Jurisdictional Areas

DRAFT

Mitigation Monitoring Plan for Affected Jurisdictional Areas

for the

Eldorado-Ivanpah Transmission Project

San Bernardino County, California

Prepared for:

Southern California Edison

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Monrovia, CA 91610

October 2011

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Mitigation Monitoring Plan for Affected Jurisdictional Areas

for the

Eldorado-Ivanpah Transmission Project

San Bernardino County, California

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October 2011

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Appendix A: Drainage Crossing Design (MM BIO-6)

1.0 INTRODUCTION

Southern California Edison (SCE) intends to construct the Eldorado-Ivanpah Transmission Project (EITP or "project") to increase electric power transmission capacity to accommodate solar generation facilities anticipated to be developed in the Ivanpah Valley area near the California-Nevada border. The EITP will replace approximately 35 miles of existing single-circuit 115-kV subtransmission line with a double-circuit 220-kV transmission line that will follow the existing SCE right-of way (ROW) between the Ivanpah Dry Lake area and the existing Eldorado Substation. The EITP will also install a redundant optical ground wire (OPGW) telecommunication line along the existing 500-kV Eldorado-Lugo transmission line from Eldorado Substation south to a new microwave communication site near Nipton, California. The EITP is located in Clark County, Nevada and San Bernardino County, California near Primm, Nevada.

This Mitigation Monitoring Plan (MMP) for Affected Jurisdictional Areas specifically describes the proposed methods to restore or realign desert wash segments that are temporarily impacted by construction activities associated with the EITP. Wash segments that may be temporarily disturbed by construction may occur in various locations where project construction activities will occur such as work areas used during the construction of 220-kV lattice steel towers (LSTs), 115-kV tubular steel poles (TSPs), or work areas used for dismantling and removing the existing 115-kV towers, as well as the construction area at the microwave communication site near Nipton, California. Wash segments may also be temporarily impacted where they must be crossed by access road spurs (that connect main access roads to tower sites) or other temporary access roads, and wash segments overlain by construction yard areas, or intersected by pulling, splicing, and tensioning areas along the project alignment. This Plan also describes success criteria, monitoring and reporting requirements for impacted desert wash segments where restoration efforts would be prescribed. This MMP is provided as a supplement to the EITP's Reclamation, Restoration, and Revegetation Plan (RRRP), which is the comprehensive plan to reestablish native vegetation in areas disturbed during construction. Both the RRRP and this MMP are required under specific mitigation measures set forth in the Final Environmental Impact Report/Environmental Impact Statement (FEIR/EIS) (i.e., Mitigation Measure (MM) BIO-2 and MM BIO-7, respectively) which guide resource protection and habitat mitigation and monitoring activities for the entire project alignment.

2.0 Plan Purpose, Need and Objectives

This plan fulfills MM BIO-7 of the project's FEIR/EIS, as presented below. MM BIO-7 requires development of a restoration plan to ensure that all waters and riparian vegetation are restored to preconstruction conditions.

The purpose of this Plan is to provide a guide for implementing and monitoring desert wash restoration activities for discrete wash segments throughout the project alignment that will be temporarily disturbed by implementation of the EITP. The main objective of this plan is to

ensure that all affected ephemeral desert wash segments, any associated habitat, and the hydrologic and water quality functions they perform are restored to pre-project conditions upon completion of construction activities.

This plan is subject to review and acceptance by the U.S. Army Corps of Engineers (USACE). The final plan will also be provided to the California Department of Fish and Game (CDFG), the Lahontan Regional Water Quality Control Board (RWQCB), as well as to the California Public Utilities Commission (CPUC).

3.0 Project Overview

3.1 Project Location

The area containing the EITP is located in the Mojave Desert in eastern San Bernardino County, California, and Clark County Nevada (See Figure 1, *Eldorado – Ivanpah Transmission Project Vicinity Map*).

In California the project can be found on the U.S. Geological Survey (USGS) 7.5' Ivanpah Lake Quadrangle Map, spanning Sections 3, 4, Township 16N Range 14E; Sections 34, 35, 26, 25, 24 Township 17N Range 14E; and Sections 19, 18, and 17, Township 17N, Range 14E.

In Nevada, the project can be found on the following USGS 7.5' Quadrangle Maps: Desert, Roach, McCullough Pass, Hidden Valley, Sloan SE, and Boulder City SW, spanning Townships 27S through 25S, and Ranges 59E, through 62E.

The proposed Ivanpah Substation is located in the Ivanpah Dry Lake Area of California (the approximate center of the site is located at: 35°, 32', 39.7" N; 115°, 28', 8.2" W). The substation site can be found on the USGS 7.5' Ivanpah Lake Quadrangle Map, Section 33, Township 17N, Range 14E.

The OPGW line can be found on the following USGS 7.5' quadrangle maps: Crescent Peak, McCullough Mountain, Highland Spring, McCullough Mountain NE, Sloan SE, and Boulder City SW in Nevada and Mineral Hill, Nipton, Crescent Peak in California.

The microwave communication site can be found on the USGS 7.5 minute Nipton quadrangle map Section 35, Township 16N, Range 15E.

3.2 Project Description

The EITP project entails removing and replacing a 35-mile section of the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115-kV transmission line with the new Eldorado-Ivanpah 220-kV double-circuit transmission line. The project will also construct a new substation (Ivanpah Substation), install upgrades within the existing Eldorado Substation, and install a redundant telecommunications link between the Ivanpah and Eldorado substations. The new telecommunication linkage will be first strung along the existing 500-kV Eldorado-Lugo transmission line for approximately 25 miles between the Eldorado Substation and Nipton Road, then would be installed underground for approximately five miles along the northern edge of Nipton Road, thence connecting to a new microwave tower a short distance north of Nipton,

California. The final element of the telecommunication linkage would involve microwave signals transmitted between the new tower near Nipton and another new tower constructed eight miles away at the Ivanpah Substation.

Site preparations, construction, and demolition efforts will be accomplished using different types of equipment and vehicles to perform road clearing and grading, dismantling and removal of existing facilities, moving equipment and material, and installing project components. Equipment to be used would include small vehicles, such as pick-up trucks, up to large semi-trucks for hauling equipment, material, and personnel. Specialized vehicles for specific work elements would include drill rigs, concrete mixers, pumping trucks, bucket trucks, as well as a boom crane, rough terrain crane, truck cranes, and other support trucks for moving and erecting the towers and substation equipment. Vehicle and equipment access throughout the EITP will occur primarily on existing access roads. However, new access spur roads are needed to get to construction sites (e.g., new tower sites) currently without road access. These new roads will be established in accordance with SCE Specification E-2008-21: *Construction of Transmission Line Access Roads and Tower Site Preparation*, the project approved SWPPP and the project's RRRP. If a new road intersects one of the ephemeral desert wash segments crossing the EITP alignment, a "natural wet crossing' will be utilized to cross the waterway, (see Appendix A, *Drainage Crossing Design Plan*). A natural wet crossing is non-structural and involves minor channel modifications[1] to reduce the slopes on affected stream banks, blending them to the grade of the new access road. The road's surface elevation will match the elevation surface of the streambed. A natural wet crossing will not impact on a wash's overall functions including but not limited to hydrology, sediment transport, or groundwater recharge. Impacts to vegetation, if present within the wash, will be confined to the footprint of the roadway.

Under certain field conditions which will be determined on-site, (e.g., size or depth of the wash, steepness of slope, seasonal risk of precipitation during construction, size or type of equipment needing to cross the drainage), additional erosion and sedimentation protections may be deemed necessary at particular crossings. In these situations temporary stream crossings will be installed and maintained throughout construction, and removed once construction is completed.

Helicopters will be used in areas where access is limited or impractical for particular activities and for transmission line stringing operations. Tensioning, pulling, and splicing equipment will be used for wire stringing operations.

Temporary impacts will primarily involve temporary stream crossings, limited disturbance in discrete construction areas surrounding new 220-kV tower sites, and disturbance within the discrete work areas such as pulling and tensioning sites, proposed construction material yards and staging areas, as well as at a few of the 115 kV tower removal sites. Impacts will also occur on several short wash segments due to the need for trenching for optic fiber cable installation along Nipton Road and from Nipton to the new microwave tower site. The majority of

[1] Minor modification can include targeted grading, limited to the width of the new road (i.e., 14 feet wide) to remove excess material (i.e., top and subsoil) to match road surface elevations.

temporary impacts to desert washes will involve minor modifications to drainages (i.e., natural stream crossings) where access must be provided for equipment and vehicles to reach specific construction activity areas. Such vehicular drainage crossings will usually be available "at grade" or at the level of the bottom of the existing drainage segment, so as to preserve flow regimes. Wherever any fill or grading is required, or if vegetation must be removed from jurisdictional areas, this plan provides guidance for preserving or restoring the morphological and hydrological character of affected areas to pre-construction conditions. In cases where revegetation is necessary, the RRRP provides appropriate guidelines and specifications for reestablishing native vegetation in disturbed areas.

Permanent impacts to jurisdictional areas associated with tower construction include displacement of short wash segments due to installation of one or more of the concrete footings that will support several of the new 220-kV towers and from establishing several new spur roads to access a few of the new tower sites. Vehicle and equipment traffic through the majority of the project will occur on the existing access road along the 115-kV line alignment.

In total, project construction was previously estimated to result in up to 2.25 acres of temporary impacts and not more than 0.33 acres of permanent impacts to the dry wash segments that cross the EITP alignment (GANDA 2011). However, because the desert washes throughout the project alignment tend to be small features, and due to some flexibility in the actual field siting or each new LST, it is anticipated that many wash segments may be avoided during construction which could reduce actual impacts to less than the previous estimates.

3.3 Environmental Setting

EITP traverses north-south through Ivanpah Valley, passing across Ivanpah Dry Lake and to the west of Roach Lake, and continues to the northeast over the McCullough Range, and through Eldorado Valley to the existing Eldorado Substation. The hot, dry climate throughout the majority of project area is typical of the Mojave Desert region. The area typically receives from three to eight inches of rain per year, which falls mostly during the winter months, though thunderstorms do occur during the summer. Flash floods are not uncommon and contributed to the extensive formation of alluvial fans throughout the region.

Windy conditions are very common throughout the region. Winds over 50 miles per hour are not uncommon, sometimes associated with thunderstorms. Prevailing wind direction in the area is typically from the southwest.

The majority of the project falls within the South Lahontan Hydrologic region and is located within the 2,830 square mile Ivanpah-Pahrump Valleys, California, Nevada. A small, southern segment of the OPGW line is located within the northeastern part of the Lower Colorado River Hydrologic region, crossing the northern, upper extent of the Piute Wash watershed. However, the area containing most of the EITP drains to a series of dry lakes: Ivanpah Dry Lake, in California, and Roach, Jean, and Eldorado Lakes, all in Nevada. Ivanpah Dry Lake, Roach Lake, Jean Lake and Eldorado Lake are all classified as a playa (NRCS 2006).

The desert washes identified throughout the project area are classified as ephemeral streams, which are defined as "a stream or portion of a stream which flows briefly in response to precipitation in the immediate vicinity, and whose channel is at all times above the groundwater reservoir" (EPA 2008). Due to the low precipitation throughout the region, these channels are also characterized by long periods without flow, and even more infrequently with flows that overtop the channel's banks (i.e., flash flood events), which occur in response to short duration, high intensity rain events that can occur throughout the year.

Due to these infrequent flows and even less common large flooding events, desert washes tend to accumulate sediments mid-reach, over time. This accumulation results from the more typical, smaller flows not being able to transport sediments completely through the system. Large flooding events can 'flush' sediments through the system which helps drive channel formation, however as noted above these large events occur much less frequently. Because the small flows tend to accumulate sediments and large, sediment transporting events are rare, desert washes tend to develop broad, often braided or shifting, shallow channels that can migrate across their floodplains over time.

Except for a few washes located along the southern part of the project's redundant OPGW line route that drain into Piute wash, all of the washes throughout the project drain to one of the playas noted above.

3.4 Regulatory Jurisdiction

All of the desert washes throughout the EITP are considered waters of the State of California or Nevada, and are therefore under the jurisdiction of the CDFG and RWQCB in California, and the Nevada Division of Environmental Protection (NDEP) in Nevada, respectively. In addition, a small subset of these washes have also been determined to be waters of the United States (U.S.) and thus fall under the jurisdiction of the USACE, because they (1) cross the California-Nevada border (CFR § 328.3(a)(2)); or (2) are tributary to Ivanpah Dry Lake which is deemed to be a water of the U.S. by the USACE under the interstate Commerce Clause (CFR§ 328.3(a)(3)); or (3) are tributary to and have a significant nexus to Piute Wash, which is considered an interstate water tributary to the Colorado River, a traditionally navigable water (Approved Jurisdictional Determination, File No. SPK-2010-00576-SG, dated December 16, 2010, and March 1, 2011).

As a water of the State of California any proposed dredge and fill activities within these washes are regulated by Fish & Game Code §1600 et seq., and Porter-Cologne Water Quality Control Act (California Water Code) §13000 et seq., administered by the CDFG and RWQCB respectively. As waters of the U.S. they are regulated by the USACE under §404 Clean Water Act (CWA), and the RWQCB and NDEP under §401 CWA.

4.0 Restoration Plan

Mitigation Measure (MM) BIO-7 set forth in the Final Environmental Impact Report / Environmental Impact Statement (FEIR/EIS) for the EITP requires development of a Mitigation

and Monitoring Plan for Affected Jurisdictional Areas within established riparian areas. MM BIO-7 specifies that the MMP will outline measures to accomplish restoration, provide criteria for restoration success, and/or provide compensation ratios.

> **MM BIO-7: Mitigation Monitoring Plan for Affected Jurisdictional Areas.** The applicant will develop a Mitigation Monitoring Plan for affected jurisdictional areas with established riparian areas, as needed for submittal to the USACE for review and approval. The plan will outline measures to accomplish restoration, provide criteria for restoration success, and/or provide compensation ratios. This measure is needed to compensate for loss of waters and riparian vegetation that provide suitable habitat for special-status and sensitive species, and provide important hydrological and water quality functions in the desert environment. Monitoring and reporting, likely for up to 3 to 5 years post-construction, will be required, pending consultation agencies. A copy of the approved Mitigation Monitoring Plan will be provided to the CPUC and CDFG.

Restoration of desert wash segments that are impacted by construction of the EITP will involve several steps. First, the existing conditions within each channel will be documented within each discrete area anticipated to be disturbed during the project construction activities such as providing temporary stream crossings for equipment access, performing 115-kV tower removal and 220-kV tower construction, working within wire pulling sites and laydown yards, etc.. Second, prior to and during construction, operational best management practices, as outlined in the project specific Stormwater Pollution Prevention Plans (SWPPPs) for various project segments will be employed and maintained to minimize impacts to the affected reaches. Third, during construction, project environmental monitors will document actual disturbances where they occur in each discrete area of jurisdictional waters. At this time, the scope and design of each channel restoration for unavoidable permanent impacts (i.e., channel realignment) will be determined, as identified in the field and as applicable. Fourth, during or after construction, channel restoration efforts will be initiated as practicable on a site by site basis, and will continue until completed.

The subsequent sections present guidelines and specifications for the implementation and monitoring of the desert wash restoration process.

4.1 Restoration Objectives

The primary goal in implementing this plan is to maintain or restore the physical characteristics, hydrological functions, and habitat characteristics of each desert wash segment disturbed by EITP construction activities so that the post-project condition is comparable in character and function to pre-project conditions, and to ensure that pre-project character and functionality is maintained within the reaches of each wash, both upstream and downstream from the project.

Physical Objectives

Desert wash segments that must be realigned because a project feature is placed in their path, will be laid out to carry storm water flows around the project feature. The realigned wash

segment will be laid out so that it has gentle bends, which may require the realigned channel to begin realignment farther upstream and terminate farther downstream than the actual direct impact to the wash. The distance upstream and downstream that the realignment will begin and end will be dependent on the size of the wash and the volume and velocity of water it can be expected to carry during storm flow. For desert washes temporarily impacted by project construction, the restored segment will be re-established in the same location.

Side slopes of the realigned and restored wash segments will not exceed 30% so that desert tortoise movement is not impeded.

Hydrologic Objectives

The hydrologic objectives for desert wash restoration are to maintain the connectivity of the desert washes, maintain flood flow capacity and to prevent creating impediments to natural sediment transport in areas where wash segments are impacted.

Habitat Objectives

The objective of habitat restoration is to reestablish native plant cover to attain equivalent cover and similar diversity as compared to pre-construction conditions in affected wash segments. In cases where project construction results in removal of natural vegetation in affected jurisdictional washes, such vegetation must be restored. However, if affected wash segments are relatively barren (e.g., due to scour, rock substrate, recent deposition, etc.), revegetation would not be warranted. In affected areas where natural vegetation is removed or disturbed, the effort to reestablish native plant materials in affected washes will be conducted as prescribed in the RRRP.

Another objective for restoring habitat is to deter establishment of noxious and invasive weed species. Guidance and specifications for weed control, particularly for preventive measures and for effective monitoring to recognize infestations early, are provided in the RRRP and in the *Invasive Plant Management Plan for the EITP*. Relevant guidance prescribed in these documents will be implemented for all areas disturbed by the project – including affected jurisdictional areas.

4.2 Documenting Pre-Construction Conditions

The pre-construction condition of each wash segment affected by project disturbance will be documented, along the EITP corridor with photographs accompanied by notes using the following guidelines.

1. Photographic documentation points (photo-points) will be mapped using a handheld GPS to record the coordinates of each photo-point location. The orientation (e.g. north, south, east, and west, as well as upstream or downstream) of each photograph taken will also be recorded at each photo-point so that comparable views can be reproduced during subsequent post-construction surveys.

2. A minimum of one photo-point will be established at each crossing or impact location.

3. Notes to accompany the photographs will be taken for each discrete segment that include identification of existing vegetation, particularly any plant materials to salvage or protect in each wash segment. Notes will provide descriptions of channel width, bank height and slope, and other unique or relevant characteristics associated with each discrete segment such as the extent of channel incision, shelf or sand bar formation, surface traits, evidence of existing soil disturbance, etc.

4. Alternatively, the *Initial Conditions Site Assessment* form provided in the RRRP (or updated /modified version thereof) may be completed to accompany photo points.

5.0 Desert Wash Preservation and Restoration

The following practices and actions will be implemented during and after construction activities to minimize disturbance during construction and to restore those impacted desert wash segments to pre-project conditions following completion of the project.

1. Throughout the duration of construction activities all relevant measures specified in the project approved SWPPP and any applicable best management practices (BMPs) outlined therein will be implemented as prescribed.

2. Natural wet crossings, will be employed at all stream crossings to the maximum extent practicable, and temporary stream crossings will be installed when determined necessary due to field conditions, as described in Appendix A. However, alternative methods not identified within this Plan, that may be developed for use under the project approved SWPPP may also be implemented when equivalent or better results will be obtained in terms of preserving values associated with desert washes.

5.1 Soil and Vegetation Salvage

1. The top four to six inches of soil and any vegetation and vegetative debris present in the disturbed area will be salvaged from the affected wash segment. Topsoil salvage, storage, and redistribution guidelines may be provided in the SWPPP instructions that supersede this limited guidance.

2. Where drainage segments are realigned, salvaged material will be distributed over the surface of the newly excavated wash segment. If there is a time lapse between construction impacts and mitigation implementation, as would be the case for temporary impact areas, salvaged material must be stockpiled for re-spreading post-construction. Stockpiled soil and organic debris must not exceed 3 feet in height and must be placed in areas where material will not be compacted by vehicles or equipment. Live native shrubs or trees in affected areas, if present, will be collected for replacing or transplanting, in accordance with methods outlined in the RRRP. Likewise, any dead woody material will be used to "vertically mulch" the realigned or restored desert wash as it is re-established.

3. Any rocky substrates encountered will be stockpiled separately and re-spread during post-construction wash restoration efforts in accordance with RRRP guidelines.
4. If a wash segment has rocks over six-inches in diameter present on the ground surface, they may be salvaged separately prior to soil salvage, stockpiled, and placed in the restored or realigned wash in a pattern similar to pre-existing conditions and to blend in with the surroundings.
5. Invasive, exotic plant species, if present, will be removed prior to soil salvage in accordance with the *Invasive Plant Management Plan* prepared for the project.
6. If there are any succulent plant species growing in the impact area, the plants will be salvaged and treated in accordance with the guidance provided in the RRRP.

5.2 Grading and Contouring

The realigned or restored desert wash segments that will mitigate for the ones being lost or temporarily impacted will have similar pre-project physical characteristics.

1. Realigned wash segment should exhibit streambed and bank widths, depth, bank steepness, and longitudinal slope that are all comparable to the wash segment being impacted (documented as prescribed above in Section 4.2) .
2. Realigned wash segments will be overexcavated by six inches so that the salvaged topsoil can be spread on the surface of the excavation and contoured to provide the final desired grade.
3. Deep ruts due to vehicles or equipment maneuvering will be recontoured and smoothed out to restore natural appearance as compared with pre-construction appearance and dimensions.

5.3 Site Restoration

1. Subsequent to grading, contouring, and distribution of salvaged soils and vegetative debris, vertical mulch may be installed. Vertical mulching typically involves securely placing or re-placing woody materials, succulent pieces, and other salvaged natural debris from the affected area over the post-construction wash in an appropriate pattern and/or as prescribed in the RRRP guidelines, where applicable. Placement of vertical mulch is intended to help stabilize soils and assist with rapid revegetation but also may help provide a deterrent to off road vehicles that could otherwise drive into desert washes.
2. Transplantation of salvaged plant materials or seed application, within or adjacent to the affected wash segments, as appropriate, will also be conducted, where appropriate and as prescribed in the RRRP guidelines.
3. Subsequent to or concurrent with initial revegetation efforts any salvaged rocks and large cobbles will be placed or replaced on the surface within the restored or realigned wash segment, in a manner that mimics their pre-construction distribution.

5.4 Maintenance

Maintenance will include weed control, watering salvaged plant material (if present), recontouring and erosion repair, as necessary.

1. Weed control will be done in accordance with the *Invasive Plant Management Plan* and the RRRP.
2. Five invasive plant species are known to be currently present in the project area that may require control including Sahara mustard (*Brassica tournefortii*), crossflower (*Chorispora tenella*), Russian thistle (*Salsola tragus*), London rocket (*Sisymbrium irio*), and tamarisk (*Tamarix* sp.) (AECOM 2010, 2011). Any salvaged and transplanted succulent plant specimens will be maintained and monitored after planting as prescribed in the RRRP.
3. Erosion repair, if needed following severe rain events, will be performed to protect the project features from damage.

5.5 Desert Wash Restoration Standards

The criteria for determining success will involve identifying that pre-project channel dimensions and hydrologic conditions have been re-established and that native vegetative cover, if any, is becoming reestablished. Other characteristics such as streambed composition, bank establishment, sediment transport through the system, and whether the restored streambed areas appear to exhibit stability,[2] will also be observed and compared relative to pre-construction conditions, to assist with determining whether restoration of affected wash segments may be considered successful. The following observable characteristics will be considered to represent successful restoration:

1. Restored channel segments exhibit approximately the same dimensions within restored channel for channel bottom width and depth of invert (i.e., bank height) (relative to mean grade of the surrounding area) as compared with pre-construction channel segments. Variations of up to 20% may be tolerated if flow capacity within the restored section (as defined by channel cross-section) is at least equivalent to or greater than undisturbed segments of the same channel within 100' upstream or downstream of the restored section limits.
2. Restored channel segments exhibit smooth transitions to undisturbed channel areas both upstream and downstream from limits of disturbance and the restored section of channel bottom exhibits a consistent slope angle throughout.
3. Restored channel segments exhibit no significant erosion or scour effects (e.g., the development of deeply incised channels) though the duration of monitoring, except as may

[2] Atypical storm events (e.g., 25-year statistical storm event or larger) resulting in high magnitude stream flows are a normal part of the hydrologic regime that influences desert wash development. Such events can produce substantial channel modifications in a short period of time. The occurrence of large, atypical storms and the potential substantial channel modifications which may result should be considered during monitoring.

be apparent in adjacent undisturbed channel sections as the result of significant or severe storm events.

4. Restored channel segments exhibit no excessive sediment accumulations, as compared with adjacent undisturbed channel sections, such that the subject reach of the restored channel becomes blocked with sediments, impeding natural flows or forcing channel migration.
5. No significant sediment deposition[3] is observed downstream from restored segments, unless similar deposition occurs in undisturbed natural channels in the vicinity due to significant or severe rain events.
6. Invasive plant species, as note in Section 5.4(1) above, do not become established in restored segments.[4]
7. Transplanted, seeded, or installed plant materials placed within the restored wash segments (that contained native vegetation prior to disturbance) exhibit evidence of becoming re-established in accordance with the performance criteria presented in the RRRP. [5]

5.6 Monitoring and Reporting Post-Construction Conditions

As soon as possible after construction and once initial restoration efforts are completed, each discrete restored segment will be surveyed by a qualified ecologist or biologist to document site conditions. Supplemental surveys to monitor conditions within restored wash segments will be conducted at least annually for three years to determine if conditions in the subject segments meet the restoration objectives. Monitoring visits will generally be performed in the spring to coincide with the growing season but additional inspections may be warranted following significant or severe rainstorms.

Monitoring and reporting will be conducted as follows:

1. Immediately following construction and initial restoration activities, photo-points will be established at each realigned or restored wash segment, as described in Section 4.2, Documenting Pre-construction Conditions, above. These new photo-points will establish the baseline for the realigned channels' establishment and stability.
2. Photographs will be taken at each mapped pre-construction photo-point at the same orientation as those taken during the pre-construction survey to allow comparison, for wash segments temporarily impacted.

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[3] The term "significant sediment deposition' is subjective, however evidence of such sedimentation can include observations of existing vegetation or site features buried by new substrate, channel in-filling, or the development and expansion of small alluvial fans.

[4] Monitoring and reporting requirements for invasive weed establishment will be conducted in accordance with the Weed Management Plan prepared for the EITP.

[5] Transplanted and/or seeded vegetation will be monitored in accordance to the RRRP. Performance criteria of all transplanted vegetation are outlined in the RRRP.

3. Annual surveys will be performed in late March or April for up to three years after initial restoration efforts are completed to determine whether restored segments exhibit channel stability over time.
4. The restoration ecologist will document existing site conditions observed within the restoration areas within each wash segment for comparison with notes made during the pre-construction survey.
5. The biologist (or restoration ecologist) will confirm that restoration objectives have been achieved or will identify any discrete areas that do not meet the objectives and recommend appropriate actions to correct discrepancies.
6. Annual reports will be prepared to document the results of surveys, including photographs comparing pre- and post-construction conditions for each temporarily affected jurisdictional wash segment. Reports will describe how each wash segment has been successfully restored or will include clear recommendations for remedial measures and identify a schedule for implementing them. Annual reports will be submitted to the BLM, the CPUC, the Lahontan Regional Board, and the USACE following completion of annual surveys. Reports prepared for Year 2 and 3 shall document results of any remedial measures that were implemented and describe whether they were deemed successful. Subsequent annual reports may not need to provide photographs to document conditions in wash segments that continue to exhibit successful restoration but should focus on areas where restoration is not deemed fully successful.
7. Any areas not meeting the restoration standards will be documented and restored, as noted above. Monitoring of these areas will continue for at least two year following implementation of remedial restorative efforts. Thus, if remedial efforts are required in Year 2 or 3 in a given wash segment, monitoring may be extended by 1 or 2 years for that particular segment.

   For example, assume that additional restoration work is required within a particular wash segment after surveys in Year 1 following initial restoration. Since two more years of monitoring are already required, no additional monitoring beyond that already scheduled, would be needed. However, if additional remedial efforts are required within another wash segment in Year 2 or 3 following implementation, at least two more years of monitoring would be required, resulting in an extension of the minimum 3-year monitoring requirement by additional one or two more years, respectively, for that particular wash segment.

8. A final survey report will be prepared and submitted to the BLM when all wash segment restoration areas are determined to have met the standards outlined in Section 5.5 above, and have demonstrated stability over time.

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Eldorado-Ivanpah Transmission Project

Figure 1
Project Vicinity

LEGEND

- Transmission Line Route
- 115 kVTransmission Line Route
- Telecommunication Line Route
- Microwave Signal
- Substations
- Microwave Tower
- Railroads
- Streets/Highways
- State Boundary
- Mojave National Preserve

0 2 4 Miles

0 2 4 Kilometers

1:180,000 1 inch = 15,000 feet

SCE Corp Environment, Health & Safety
Eldorado-Ivanpah Transmission Project
Projection: NAD 83 UTM Zone 11N
Date: 4/27/2011

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Appendix A

Drainage Crossing Design (MM BIO-6):

DRAFT

Drainage Crossing Design (MM BIO-6)

Eldorado-Ivanpah Transmission Project

San Bernardino County, California

Prepared for:

Southern California Edison

1218 South 5th Avenue

Monrovia, CA 91610

Source: Caltrans Storm Water Quality Handbooks, 2003
Construction Site Best Management Practices Manual
Temporary Stream Crossing NS-4

October 2011

Natural Wet Crossing

Definition and Purpose

A natural wet crossing is a non-structural method of crossing an ephemeral waterway that reduces the grade of the stream's banks to create an established roadway which allows vehicles to cross the waterway during construction and for on-going maintenance. The natural wet crossing reduces off-road vehicle traffic and minimizes erosion and downstream sedimentation caused by the vehicle traffic.

Appropriate Applications

Natural wet crossings are installed at sites:

- Where appropriate permits have been secured (1602 Agreements, 404 Permits, and 401 Certification).
- Where construction equipment or vehicles need to frequently cross ephemeral waterways.
- Where inspection and maintenance equipment or vehicles will need on-going, periodic access.
- When alternate access routes are unavailable or impose significant constraints.
- When structural crossing solutions are impractical or unwarranted due to:
    - Small channel width
    - Shallow channel banks
    - Infrequent flows

Limitations

- Will usually disturb the waterway during initial grading and periodic (semi-annual) maintenance grading.
- May require Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers (USACE) 404 Nationwide permit, and California Department of Fish and Game (CDFG) 1602 Streambed Alteration Agreement. If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required.
- May be impassible /unusable during, and immediately following periods when streams are flowing.
- May require significant restorative efforts if impacted by large magnitude storm event.

Standards and Specifications

General Considerations

Location of the natural wet crossing shall address:

- Type and frequency of construction equipment requiring access.
- Site selection where erosion potential is low.
- Site selection where side slopes are the least steep relative to the surrounding terrain, as practicable.

- Areas where the side slopes from road runoff will not spill into the side slopes of the crossing.
- Depth and stability of streambed substrate.

Construction Considerations:

- Stabilize construction roadways, adjacent work area and stream bottom against erosion.
- Construct during dry periods to minimize stream disturbance and reduce costs.
- Construct at or near the natural elevation of the stream bed to prevent potential flooding upstream of the crossing.
- Install temporary sediment control BMPs in accordance with sediment control BMPs presented in the project approved Storm Water Pollution Prevention Plan to minimize erosion of embankment into flow lines.
- Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where riparian vegetation, or aquatic organisms may be destroyed, except as authorized, and as necessary to complete the work.
- Natural wet crossings shall be constructed to minimize scour.
- The exterior of vehicles and equipment that will encroach on the water body within the project shall be maintained free of grease, oil, fuel, and residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment.
- Drip pans shall be placed under all vehicles when the vehicle or equipment is planned to be idle for more than one hour.

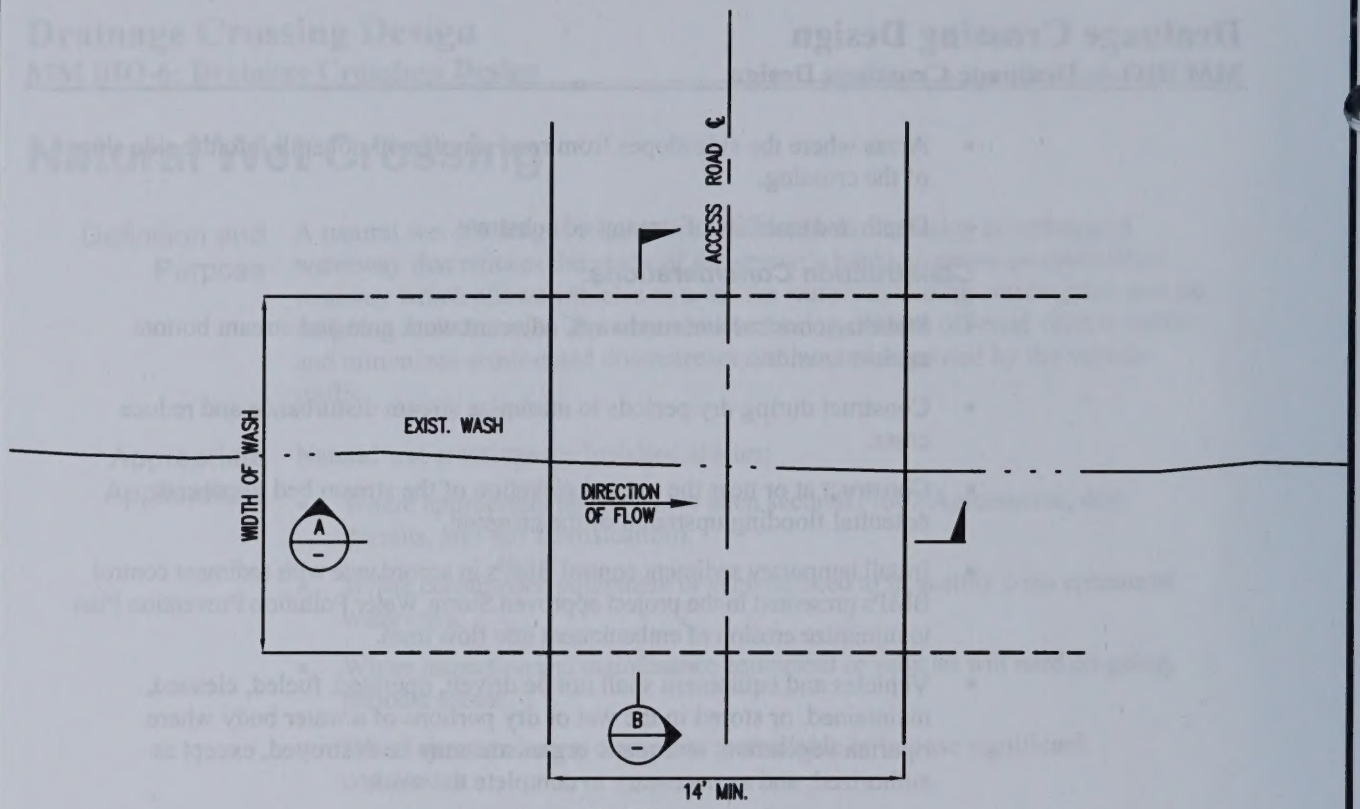
Specific Considerations:

- If large equipment such as cranes, and/or a large volume of construction traffic is anticipated (e.g., the natural wet crossing is located on main access road into the project site), a temporary crossing (i.e., ford) may be appropriate to install, during construction activities, to provide additional erosion protection and stabilization within the stream channel.

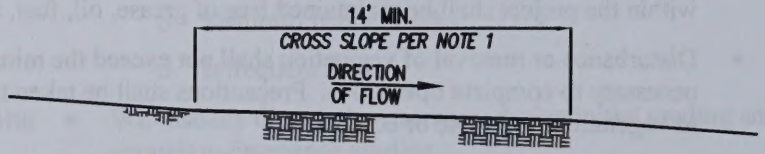
Maintenance and Inspection

Maintenance provisions shall include:

- Inspection shall, at a minimum, occur monthly and after each significant rainfall, and include:
    - Checking for erosion, channel/bank incisment or undercutting, and channel scour.
    - Checking for excessive sediment or debris deposition and other crossing obstructions.



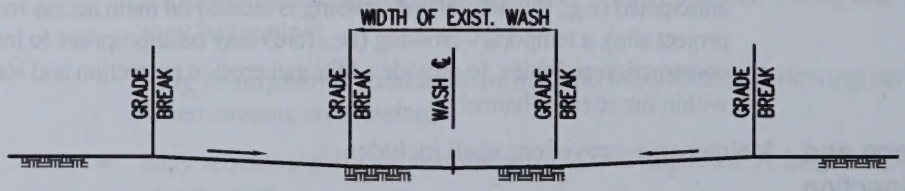
PLAN VIEW



NOTE:

1. CROSS SLOPE TO MATCH SLOPE OF EXISTING WASH.

SECTION A



SECTION B

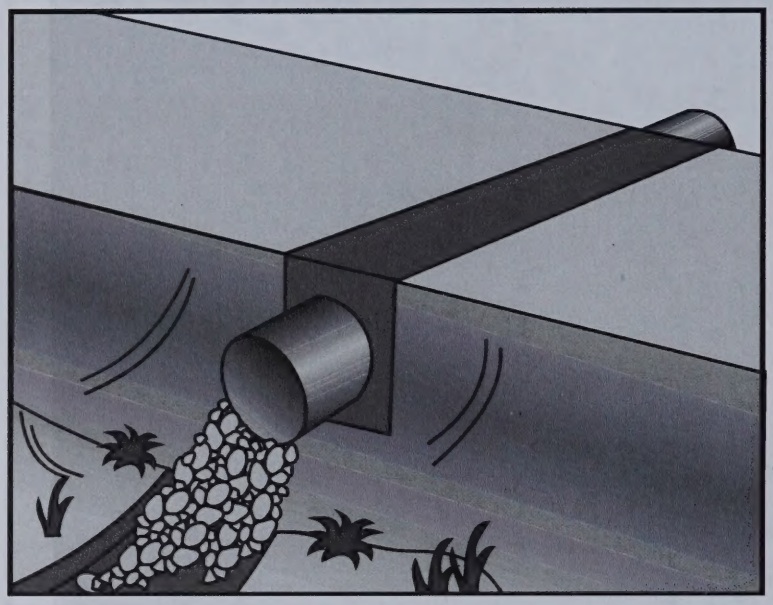
			Location: ELDORADO–IVANPAH TRANSMISSION PROJECT
			NATURAL WET CROSSING
			SOUTHERN CALIFORNIA EDISON® An EDISON INTERNATIONAL® Company
No.	Revisions	Made	P.E.
			PRDT0001.DWG

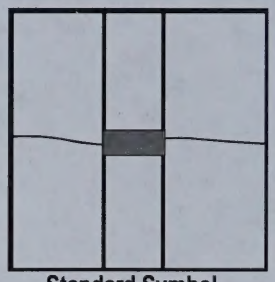
Drainage Crossing Design

MM BIO-6: Drainage Crossings Design

Examples of Natural Wet Crossings

Temporary Stream Crossing





Standard Symbol

BMP Objectives

- ● Soil Stabilization
- ○ Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ● Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

A temporary stream crossing is a structure placed across a waterway that allows vehicles to cross the waterway during construction, minimizing, reducing, or managing erosion and downstream sedimentation caused by the vehicles.

Appropriate Applications

Temporary stream crossings are installed at sites:

- Where appropriate permits have been secured (1602 Agreements, 404 Permits, and 401 Certification).
- Where a natural wet crossing is insufficient to prevent or reduce the risk of erosion and downstream sedimentation.
- Where construction equipment or vehicles need to frequently cross a waterway.
- When alternate access routes impose significant constraints.
- When crossing perennial streams or waterways causes significant erosion.
- Where construction activities will not last longer than one year.

Drainage Crossing Design

MM BIO-6: Drainage Crossings Design

Limitations

- Will usually disturb the waterway during installation and removal.
- May require RWQCB 401 Certification, USACE 404 Nationwide permit, and California Department of Fish and Game CDFG 1602 Streambed Alteration Agreement. If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required. If monitoring related to these numerical-based water quality standards is not addressed in the contract documents, contact the Resident Engineer (RE).
- Installation may require dewatering or temporary diversion of the stream. See California Stormwater Quality Association BMP NS-2, "Dewatering Operations" and NS-5, "Clear Water Diversion." Due to the ephemeral nature of the majority of the drainage features within the project alignment the need for dewatering or water diversions is not anticipated.
- May become a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.
- Use of natural or other gravel in the stream for construction of Cellular Confinement System (CCS) (refer to figure at the end of the section) ford crossing will be contingent upon approval by fisheries agencies.
- Ford crossings may degrade water quality due to contact with vehicles and equipment.
- CCS should not be used in excessively high or fast flows.
- Upon completion of construction activities, CCS blocks must be removed from stream.

Standards and Specifications

General Considerations

- Location of the temporary stream crossing shall address:
- Site selection where erosion potential is low.
- Areas where the side slopes from road runoff will not spill into the side slopes of the crossing.

The following types of temporary stream crossings shall be considered:

- Culverts - Used on perennial and intermittent streams.
- Fords - Appropriate during the dry season in arid areas. Used on dry washes and ephemeral streams, and low flow perennial streams. CCS, a type of ford crossing is also appropriate for use in streams.

Design and installation requires knowledge of stream flows and soil strength. Designs shall be prepared under direction of, and approved by, a registered civil and/or structural engineer. Both hydraulic and construction loading requirements shall be considered with the following:

- Comply with the requirements for culvert crossings, as contained in Specification E-2008-21 Construction of Transmission Line Access Roads and Tower Site Preparation, December 5, 2008, particularly if the temporary stream crossing will remain through the rainy season.

- Provide stability in the crossing and adjacent areas to withstand the design flow. The design flow and safety factor shall be selected based on careful evaluation of the risks due to over topping, flow backups, or washout.
- Avoid oil or other potentially hazardous waste materials for surface treatment.

Construction Considerations:

- Stabilize construction roadways, adjacent work area and stream bottom against erosion.
- Construct during dry periods to minimize stream disturbance and reduce costs.
- Construct at or near the natural elevation of the stream bed to prevent potential flooding upstream of the crossing.
- Install temporary sediment control BMPs in accordance with sediment control BMPs presented in the project approved Storm Water Pollution Prevention Plan to minimize erosion of embankment into flow lines.
- Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as authorized by the RE, as necessary to complete the work.
- Temporary water body crossings and encroachments shall be constructed to minimize scour. Cobbles used for temporary water body crossings or encroachments shall be clean, rounded river cobble.
- The exterior of vehicles and equipment that will encroach on the water body within the project shall be maintained free of grease, oil, fuel, and residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation shall be replaced with the appropriate soil stabilization measures.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
- Any temporary artificial obstruction placed within flowing water shall only be built from material, such as clean gravel, that will cause little or no siltation.
- Drip pans shall be placed under all vehicles when the vehicle or equipment is planned to be idle for more than one hour.
- Conceptual temporary stream crossings are shown in figures at the end of this section.
- Prior to the installation of each temporary crossing, a qualified restoration ecologist shall document the site conditions of each crossing location.

- Following the removal of each temporary crossing, desert wash restoration and revegetation efforts shall be conducted in accordance with the Mitigation Monitoring Plan for Affected Jurisdictional Areas and the Reclamation, Restoration, and Revegetation Plan prepared for the project.

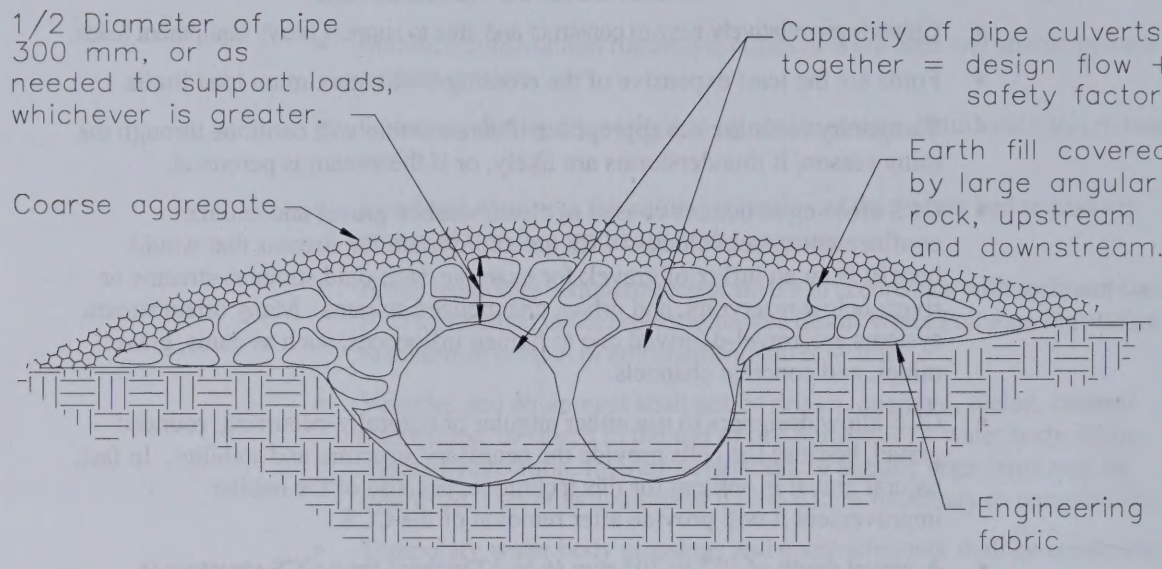
Specific Considerations:

- Culverts are relatively easy to construct and able to support heavy equipment loads.
- Fords are the least expensive of the crossings, with maximum load limits.
- Temporary fords are not appropriate if construction will continue through the rainy season, if thunderstorms are likely, or if the stream is perennial.
- CCS crossing structures consist of clean, washed gravel and cellular confinement system blocks. CCS are appropriate for streams that would benefit from an influx of gravel; for example, salmonid streams, streams or rivers below reservoirs, and urban, channelized streams. Many urban stream systems are gravel-deprived due to human influences, such as dams, gravel mines, and concrete channels.
- CCS allow designers to use either angular or naturally-occurring, rounded gravel, because the cells provide the necessary structure and stability. In fact, natural gravel is optimal for this technique, because of the habitat improvement it will provide after removal of the CCS.
- A gravel depth of 152 to 305 mm (6 to 12 inches) for a CCS structure is sufficient to support most construction equipment.
- An advantage of a CCS crossing structure is that relatively little rock or gravel is needed, because the CCS provides the stability.

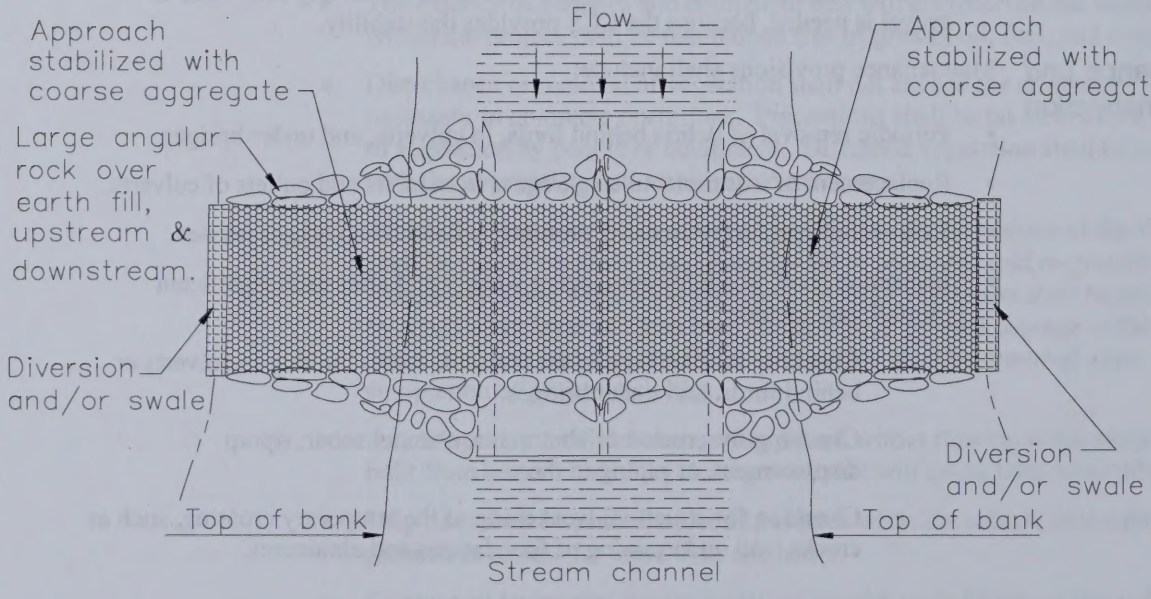
Maintenance and Inspection

Maintenance provisions shall include:

- Periodic removal of debris behind fords, in culverts, and under bridges.
- Replacement of lost protective aggregate from inlets and outlets of culverts.
- Removal of temporary crossing promptly when it is no longer needed.
- Inspection shall, at a minimum, occur weekly and after each significant rainfall, and include:
    - Checking for blockage in the channel, debris buildup in culverts or behind fords, and under bridges.
    - Checking for erosion of abutments, channel scour, riprap displacement, or piping in the soil.
    - Checking for structural weakening of the temporary crossing, such as cracks, and undermining of foundations and abutments.

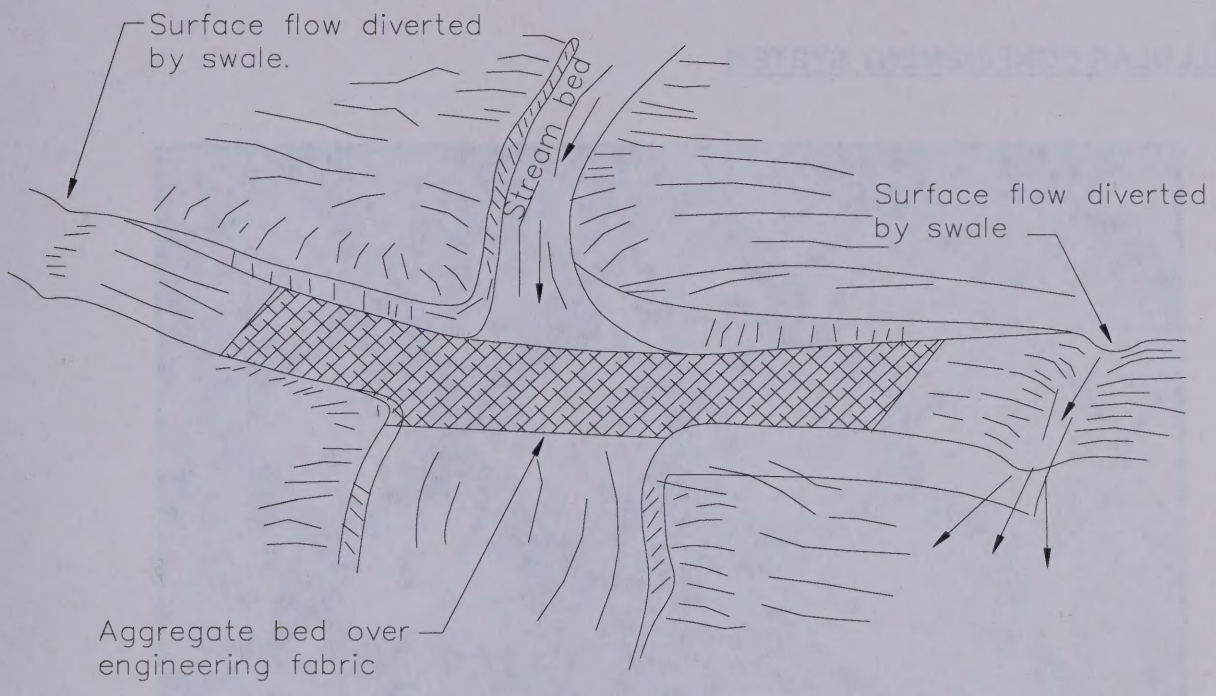

1/2 Diameter of pipe 300 mm, or as needed to support loads, whichever is greater.
Capacity of pipe culverts together = design flow + safety factor
Earth fill covered by large angular rock, upstream and downstream.
Coarse aggregate
Engineering fabric

ELEVATION

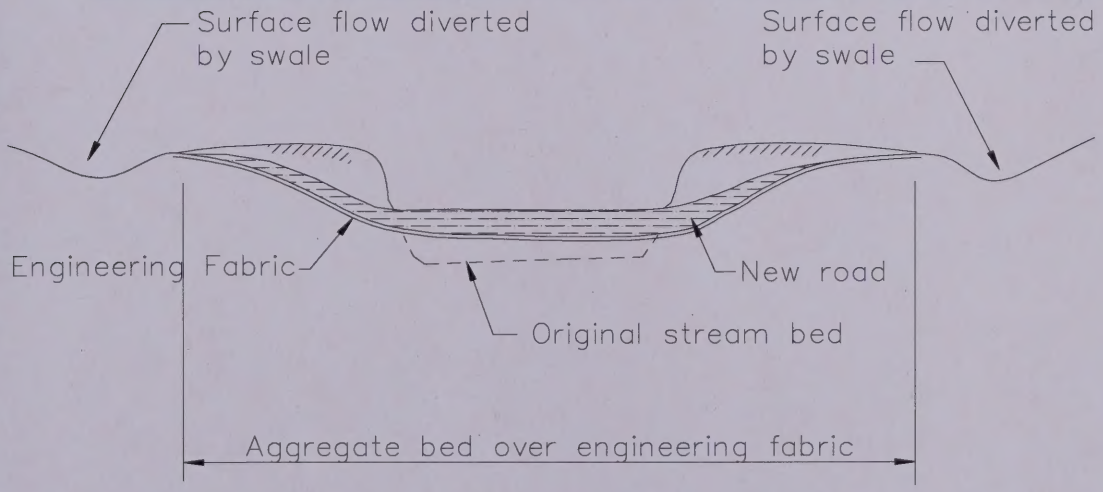


PLAN VIEW

TYPICAL CULVERT CROSSING
NOT TO SCALE



Aggregate approch
1:5 (V:H) Maximum slope on road



TYPICAL FORD CROSSING
NOT TO SCALE

CELLULAR CONFINEMENT SYSTEM

Eldorado-Ivanpah Transmission Project

Lighting Plan

Anticipated Submittal Date: 10/31/2011

Eldorado-Ivanpah Transmission Project

Avian Protection Plan

Eldorado-Ivanpah Transmission Project

Avian Protection Plan

SOUTHERN CALIFORNIA EDISON
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October 2011

Heather Beeler
United States Fish & Wildlife Service
2800 Cottage Way
Sacramento, CA 96825
Heather_beeler@fws.gov
(916) 414-6651

Subject: Avian Mitigation and Monitoring Plan for Southern California Edison's Eldorado-Ivanpah Transmission Project, San Bernardino County, California and Clark County, Nevada

Dear Ms. Beeler:

Please find for your review the Avian Mitigation and Monitoring Plan for Southern California Edison Company's (SCE) Eldorado-Ivanpah Transmission Project (EITP). SCE intends to construct the EITP to increase electric power transmission capacity to accommodate new generation, the vast majority of which is renewable, under development in the Ivanpah Valley area near the California-Nevada border. This document describes specific measures that will be implemented and identifies guidance and standards related to structures that are to be followed to prevent injury or mortality to large raptor species, particularly golden eagle (*Aquila chrysaetos*).

To prevent confusion with SCE's company-wide Avian Protection Plan developed in accordance with the Avian Protection Plan Guidelines from United States Fish and Wildlife Service (USFWS) and Avian Powerline Interaction Committee (APLIC) (2005), this plan has been titled the Avian Mitigation and Monitoring Plan.

EITP is essential to provide timely transmission infrastructure updates to connect ARRA DOE loan Guarantee projects to the transmission grid, all of which are on accelerated schedules. These include the BrightSource/NRG/Google Ivanpah Solar Electric Generating System (ISEGS) project and future projects currently under review. We are hoping the estimated USFWS review period of 30 days, provided to us by the California Public Utilities Commission's consultant E&E, is still applicable.

I would like to follow up with you some time later next week to discuss the review schedule and answer any questions you may have.

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL™ Company

Should you have any questions or concerns with the project or plan, please feel free to call me at 626-862-5087.

Sincerely,

Jack Goldfarb

Biologist

Biological & Archaeological Resources Group
Southern California Edison
1218 S. Fifth Avenue
Monrovia, CA 91016
626-862-5087
jack.goldfarb@sce.com

Enclosures:

- EITP Avian Mitigation and Monitoring Plan

Eldorado-Ivanpah Transmission Project
Avian Mitigation and Monitoring Plan

DRAFT

October 6, 2011

Eldorado-Ivanpah Transmission Project
Avian Mitigation and Monitoring Plan

Should you have any questions or concerns with the project or plan, please feel free to contact me at 626-302-[illegible].

Sincerely,

Jack Goldfarb

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1218 S. Fifth Avenue
Monrovia, CA 91016
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Enclosure(s):
- ESTP Avian Mitigation and Monitoring Plan

October 6, 2011

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INTRODUCTION

Southern California Edison (SCE) intends to construct the Eldorado-Ivanpah Transmission Project (EITP or Project) to increase electric power transmission capacity to accommodate solar generation facilities anticipated being developed in the Ivanpah Valley area near the California-Nevada border. The EITP will replace approximately 35 miles of existing single-circuit 115 kV transmission line with a double-circuit 220 kV transmission line extending from near the Ivanpah Dry Lake in California to the Eldorado Substation in the Eldorado Valley east of the McCullough Range. The EITP is located in Clark County, Nevada and San Bernardino County, California near Primm, Nevada (Figure 1, Vicinity Map).

This document describes specific measures that will be implemented and identifies guidance and standards related to structures that are to be followed to prevent injury or mortality to large raptor species, particularly golden eagle (*Aquila chrysaetos*). To prevent confusion with SCE's company-wide Avian Protection Plan developed in accordance with the Avian Protection Plan Guidelines (United States Fish and Wildlife Service (USFWS) & Avian Powerline Interaction Committee (APLIC) 2005) , this plan has been titled the Avian Mitigation and Monitoring Plan.

PROJECT DESCRIPTION

The EITP consists of three main components: (1) removal and replacement of the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kilovolt (kV) transmission line with the new Eldorado-Ivanpah 220 kV double-circuit transmission line; (2) installation of a redundant fiber-optic telecommunication line along a separate route from the 220 kV line including microwave towers on either side of the Ivanpah Valley; and (3) construction of the new Ivanpah Substation. Minor elements of the project will include construction of a subtransmission line to connect the proposed Ivanpah Substation to the existing 115 kV subtransmission system and a distribution line to provide power to the microwave transmitter near Nipton, California.

Transmission Line

The transmission line rebuild involves the removal of approximately 35 miles of the existing SCE Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line and all the old H-frame support structures for that line and installation of a new double-circuit 220 kV transmission line on new Lattice Steel Towers (LSTs) between the proposed Ivanpah Substation in California and the existing Eldorado Substation in Nevada (Figure 1, Project Vicinity). Figure 2 depicts the appearance and basic dimensions of the proposed LSTs that will carry the 220 kV transmission lines.

The EITP will be constructed within an existing SCE transmission line ROW which contains areas of pre-existing ground disturbance. However, the existing SCE 70- to 100-foot-wide ROW will need to be widened to a minimum 100-foot to 130-foot-wide ROW to accommodate the 220 kV transmission line. At utility transmission line crossings, a 250-foot ROW would be required for side-by-side single-circuit

220 kV steel H-frame structures. Limited new spur roads will be required for the new towers. Most of the existing towers are adjacent to the existing road built between 1930 and 1931 and maintained thereafter.

Construction Yards and Helicopter Staging Locations

Project construction would begin with establishment of up to seven temporary construction yards and two helicopter landing sites located at strategic points along the route. Providing yard space for equipment and materials storage and staging will involve clearing and possibly grading.

Helicopters would be used during construction in the McCullough Pass area for line stringing, as well as during installation of an Optical Ground Wire (OPGW) along a redundant telecommunications route through the Highland Range (described below). Helicopters will also be used for material and personnel transport. Two helicopter landing zones have been identified; one on the east side of the pass through the McCullough Range and the other west of the McCullough Range.

Site Preparation

Installation of the 220 kV transmission line would involve construction of approximately 216 new LSTs (Figure 2) and approximately 21 steel H-frame structures (depicted in Figure 3). The structure locations and the 25-foot clearance area around the structures would require clearing of vegetation. The LSTs and steel H-frame structures would be assembled in an approximately 200-by-200-foot laydown area

Conductor Installation

Stringing includes all activities associated with installation of the transmission line conductors and also the OPGW onto the LSTs and/or the steel H-frames.

On the EITP 220 kV transmission line, in addition to tower sites, pulling and tensioning sites would be used for both wire and OPGW installations. The proposed stringing activities on the Eldorado–Lugo 500-kV line would be for the OPGW installation only.

Telecommunication Line

Telecommunications facilities associated with the Ivanpah Substation and the new 220 kV transmission line will be constructed using two separate telecommunication paths. One of the telecom lines will be strung on the new 220 kV transmission line. The second, redundant telecom line would consist of another OPGW line strung on the existing Eldorado-Lugo 500 kV transmission line from the Eldorado Substation to Nipton Road (Highway 164), where it will be installed underground in the road shoulder on the north side of Nipton Road to the town of Nipton (Figure 1, Project Vicinity). Installing the OPGW on the 500-kV transmission line will require approximately 45 transmission towers to be reinforced to support the additional wind loading of the OPGW. At Nipton, the telecom line extends underground to the north approximately 0.6 mile to a new microwave tower and then by microwave to the Ivanpah Substation. The microwave site at Nipton will also require installation of a wood pole overhead distribution line, overhead transformer, and underground service for power. A construction yard will be located at Nipton.

Subtransmission Line

A new 600- to 800-foot section of 115 kV line would be strung from a connection point at milepost 34 on the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115 kV line to a new rack position at the proposed Ivanpah Substation, to create the Cool Water-Baker-Dunn Siding-Mountain Pass-Ivanpah 115 kV subtransmission line. At the transition point of the proposed project transmission line route going north into the Ivanpah Substation, seven existing LST H-frame structures would be removed and replaced with one single-circuit engineered tubular steel pole (TSP) and six lightweight steel (LWS) H-frames within the existing Eldorado–Baker–Cool Water–Dunn Siding–Mountain Pass 115 kV transmission line ROW. Six additional LWS H-frames would be installed at replaced structures to meet current requirements. Approximately three single-circuit engineered TSPs would be installed and looped in to the proposed Ivanpah 115 kV rack position.

Distribution Lines

A 33 kV distribution line would be installed to provide reliable lighting and power service to the new Ivanpah Substation. This component would consist of approximately 4,800 feet of new underground and approximately 1,600 feet of new overhead 33 kV circuitry. In addition, approximately 4,300 feet of a new 33 kV overhead line would be installed between the town of Nipton and the new microwave site proposed to be located northeast of Nipton. A transformer would be installed on an overhead pole connecting to the microwave site using an underground duct. The overhead line would be installed along the side of an existing unnamed dirt road.

Ivanpah Substation Construction

SCE substation construction will include final grading of the site to substation specifications, installation of an 8-foot perimeter fence, installation of a ground grid, substation equipment installation, paving of internal driveways, and covering unpaved surfaces with crushed rock.

Site Cleanup

SCE would restore all areas that were temporarily disturbed by project activities, including temporary access routes, material staging yards, pulling and tension sites, splicing sites and tower removal and construction areas following the completion of construction.

Operation and Maintenance

After construction is completed, the Project's operations and maintenance efforts will include routine line patrols, insulator washing, and maintaining anti-climbing guards, repairing or replacing poles and towers and re-stringing conductors. Periodically, weed control and road maintenance will be required and emergency repairs may be necessary when and if damage occurs from high winds, wildfires or other natural events or accidents.

BASELINE INFORMATION

An understanding of the existing conditions, or "baseline" information strongly indicates that EITP is highly unlikely to represent a new or additional collision risk to the golden eagle or to any other large raptor species. EITP is simply replacing one of many existing transmission lines in the Eldorado and Ivanpah Valleys, which contain several existing transmission lines and many hundreds of towers. Several of the existing transmission lines that pass through the area are strung on towers that are at least as large as or larger than the proposed LSTs that will carry the new 220 kV transmission line for the EITP (as shown in Figure 2). As a visual aid, Figure 5 presents views of the existing 115 kV line along with some of the other transmission lines that now exist in the designated utility corridor containing the EITP. Several of these transmission lines transit through the unnamed pass through the McCullough Range along with the 115 kV Line which EITP will replace.

As the Final EIR/EIS observes, there have been no documented golden eagle mortalities in the area with respect to the existing transmission infrastructure that would be replaced by the EITP. The lack of documented mortalities in the area and the findings of published studies suggest that (1) golden eagles currently co-exist with the existing transmission line infrastructure, and (2) any collision risk associated with the replacement of the existing line is not expected to be significantly greater than the existing baseline of no collisions or electrocutions. (*See* Final EIR/EIS at 3.4-93). As documented by the recent aerial survey conducted by WRI (Appendix A), no active golden eagle nests occur within a mile of the existing transmission lines through the pass.

The Final EIR/EIS concluded that EITP is unlikely to impact golden eagle foraging habitat. Suitable foraging habitat for golden eagle is present throughout the majority of the Ivanpah and Eldorado Valleys. Given the large contiguous foraging habitat present and the relatively small disturbance areas associated with construction of the Project, the construction, operation, and maintenance of the Project likely will have only minor, if any, impacts on golden eagles.

Golden Eagle Database Queries

California: A search of the California Natural Diversity Database prior to the initiation of 2011 golden eagle surveys found no recorded golden eagle observations within 10 miles of the Project area in California. Recent reports from proposed solar projects in the Ivanpah Valley in California have not yet been released. Preliminary data provided by the BLM shows active eagle territories in the vicinity of EITP, though the closest active nest is just over 4 miles from the Project.

Nevada: No golden eagle observations were recorded within 10 miles of the Project in the Nevada Natural Heritage Program biological data acquired in 2010. Recent reports from the Nevada Department of Wildlife (NDOW) of golden eagle data for the area within 10 miles of EITP in Nevada, however, indicate that two golden eagle nests were identified within approximately 3 miles of the Project. Neither nest will be directly impacted from construction. The closest identified nest is located

in the Highland Range 1.5 miles east of the new fiber optic communication line on the existing Eldorado-Lugo transmission line. The second identified nest is located in the North McCullough Range approximately 3 miles northwest of the proposed transmission line. Both nests were identified during a May 2008 aerial cliff nesting raptor survey.

Project-Specific Raptor Surveys

Golden Eagle Surveys

Wildlife Research Institute (WRI) conducted golden eagle surveys during the spring 2011 season following guidance provided by USFWS in the Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (Pagel et al. 2010). A total of 20 territories were identified, 10 of which were occupied (Appendix A). None of the total of 94 golden eagle nests identified, including the 10 active nests, occur within 4,000 feet of project activities and therefore no impacts to golden eagle nests are anticipated from project activities during the nesting season. The closest golden eagle nest to the project is over 4,500 feet away and was occupied by a prairie falcon during the 2011 surveys. Of the active golden eagle nests found, the closest active nest was over 7,400 feet away from project activities.

Raptor Surveys

Baseline raptor surveys were conducted by Environmental Planning Group (EPG) from January through May 2010 and supplemented by additional surveys in late March in the Spring of 2011(Appendix B). The surveys identified 22 independent sightings of six raptor species in 2010 and 14 independent sightings of four raptor species in March 2011 including Red-tailed Hawk (*Buteo jamaicensis*) (9), American Kestrel (3), a single Swainson's Hawk (*Buteo swainsoni*) and Prairie Falcon (*Falco mexicanus*). Based on 2010 surveys, as no raptor nests were observed in transmission structures or near areas potentially disturbed during construction on the Eldorado to Ivanpah transmission line route, it was concluded that portion of EITP is not likely to require mitigation related to nesting raptors or other birds presently using transmission structures. Likewise, the surveys in 2011 found several stick nests attributable to common ravens, which validates the 2010 findings.

During the spring 2010 raptor survey, one golden eagle individual was observed perched on a lattice tower in the Project area, south of the Eldorado Substation on a neighboring non-SCE transmission line running parallel to and east of the existing Eldorado-Lugo 500 kV line. There were no golden eagle nests observed during the raptor surveys in the Project area. There was one golden eagle sighted near the Eldorado-Lugo transmission line, which will only receive minor modifications to some of the tower structures and a modified telecommunication line. This transmission line will not be completely rebuilt.

No raptor species listed under the Endangered Species Act (ESA) were observed during the spring 2010 raptor survey. A single Peregrine Falcon was observed in the Project area near Primm, Nevada. Peregrine Falcons were previously listed under the ESA, but have since recovered and were delisted in 1999. Post-delisting monitoring is required under the ESA, and will continue for the Peregrine Falcon until at least 2015. However, no Project-related actions are required under the ESA for federally listed avian species, such as a project-specific monitoring plan for the species. In 2011, a single Swainson's

hawk, a federally-threatened species, was observed flying over the project area, but was deemed to be migrating and thus would not be potentially affected by project activities.

Conclusion

Based on the baseline information collected during the raptor and golden eagle surveys, there is a low incidence of golden eagles and other raptor species near the Project site. The Project is unlikely to impact golden eagle breeding behavior and impacts to other protected bird species will be mitigated by the measures laid out in the Final EIR/EIS (see Mitigation and Conservation Measures below). In addition, project design features will prevent electrocution of golden eagles and other protected bird species.

DRAFT

PROJECT DESIGN FEATURES

Although transmission lines present a collision risk for some bird species, studies have found that raptors, which are good fliers and quite agile, are much less likely to collide with power lines and are generally not at high risk for collisions. (Bevanger 1999; Janss 2000; Erickson et al. 2005). For example, Bevanger (1998) reviewed 16 investigations of bird collisions with power lines and found waterfowl and shorebirds to comprise the majority of collisions. Accipitridae (hawks, eagles, vultures) accounted for 7 individuals out of a total of 12,226, or 0.05%. Of this very small percentage, no distinction was made in the study between transmission lines and distribution lines, nor between types of Accipitridae. Review of utility mortality data in California, Oregon, Idaho, Wyoming, Montana, and Utah also indicates low collision rates of golden eagles with transmission lines. The data shows only one documented eagle collision on a PacifiCorp 230 kV transmission line and no eagle electrocutions on any transmission lines at or above 220 kV for other western utilities. Based upon available studies, very few eagle mortalities were attributed to electrocution from, or collisions with, transmission lines of 220 kV or above.

As required by Mitigation Measure MM BIO-15 in the EITP Final EIR/EIS, the transmission and distribution lines for the Project will be designed to avoid electrocution of avian species by following Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. (APLIC 2006). EITP will follow APLIC guidance regarding minimum recommended clearances of 60 inches horizontal separation and 40 inches vertical separation between phase conductors or between phase conductors and grounded hardware. These clearances are based on the size—specifically, the wrist-to-wrist measurement—of a golden eagle. The potential for electrocution on transmission lines, and EITP in particular, is very low because of the separation distance between conductors and between conductors and ground in the design of transmission lines with voltages 220 kV and above (see Figures 2 and 3).

Distribution lines are known to present an electrocution risk to raptors, including eagles, due to (1) the short distance between conductors or between conductors, or (2) the short distance between other energized components and the ground. Per APLIC guidance, however, SCE will utilize avian-safe designs on EITP's distribution lines, minimizing risk to raptors. (APLIC 2006). APLIC guidelines include using protective covers on equipment poles and providing a minimum of 60 inches of separation between conductors using design standards depicted on Figure 4.

Based on the best biological information available regarding eagle and raptor mortalities, EITP's design and implementation of the Mitigation Measures in the Final EIR/EIS will insure that the take of golden eagles and other raptors is unlikely to occur. In addition, the Project's design and mitigation measures will address impacts to other protected bird species known to occur within the Project area. Designing the Project to prevent electrocution of eagles will also prevent the electrocution of other protected bird species, many of which are smaller than the golden eagle. Implementation of the mitigation measures in the Final EIR/EIS will prevent the take of protected birds and their nests through preconstruction surveys (MM BIO-1), biological monitors (MM BIO-10), and development of a nesting bird management plan in response to MM BIO-15.

MITIGATION AND CONSERVATION MEASURES

As demonstrated by the lack of recorded mortality in the area around the existing transmission line, the risk of golden eagle take is very low. However, the following mitigation measures set forth in the Final EIR/EIS, which include the preparation of this Avian Mitigation and Monitoring Plan (AMMP), are intended to assure a net zero loss of golden eagle and will reduce impacts to other important and/or protected large raptor species to below a significant level.

AMMP Conservation Measures

Golden Eagle Active Nest Buffer

To prevent impacts to nesting golden eagles by construction activities, SCE will conduct all construction activities within 4,000 feet of a nest outside of the nesting season for golden eagles in Southern California unless it has been determined a nest is not active that year.

Nesting Bird Management Plan

A nesting bird management plan will be developed following a template created from a plan developed in consultation with and approved by the California Department of Fish and Game (SCE 2011). This plan will detail survey requirements and protocols, determination of nest buffers, and reporting requirements. Reporting information is given below.

Avian Reporting System

SCE has an internal procedure for avian mortalities and nest issues. Patrolmen and Troublemen responsible for patrolling the lines and investigating interruptions on the system report mortality and nests using the Wildlife Mortality/Bird Nesting Report and an annual report is submitted to USFWS in compliance with SCE's Special Purpose Permit.

During the construction phase of the Project, as a part of the nesting bird management plan for the Project, daily and weekly biological monitoring reports will be generated. All data collected for the daily reporting will be input from the field on hard copy paper forms or mobile smartphones using an offline form, and then entered/uploaded online into the database. A nesting bird table, updated weekly for submittal to the CPUC, USFWS, and CDFG, will show the current status of all active nests within the construction areas (if any), distances of disturbance-free buffers that have been implemented to avoid nest failures, proximity to active construction activities, and estimated fledge date. As required by MM BIO-15, all active nests and disturbance or harm to active nests will be reported within 24 hours to the USFWS, BLM, CDFG, and NDOW upon detection.

Post Construction Surveys

Although no post construction surveys specific to avian mortality are being proposed in this plan, post construction surveys required as a part of the raven management plan will include documentation of avian mortality associated with SCE facilities. The raven management plan surveys will continue for a minimum of 3 years after project construction. In addition, as mentioned above, Patrolmen and Troublemen frequently patrol SCE lines and are required to report any bird mortality encountered as a result of interaction with SCE facilities.

EIR/EIS Mitigation Measures

The Final EIR/EIS included numerous mitigation measures, including the preparation of this AMMP that upon implementation, will reduce any risk to raptors, including golden eagles, to minimal levels. Specifically, SCE will comply with the following relevant mitigation measures:

MM BIO-18: Avian Protection Plan

To reduce impacts on golden eagles and raptors, the Final EIR/EIS required SCE to submit an Avian Protection Plan, which is embodied in this Avian Mitigation and Monitoring Plan, for approval to the BLM within 6 months of the issuance of any ROW grant for the Project. The Final EIR/EIS acknowledges that an Avian Protection Plan can reduce any impacts to the golden eagle in a manner that complies with the no net loss standard.

The Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols, cited in MM BIO-18, and other recommendations in support of eagle management and permit issuance, provides protocols for conducting golden eagle surveys. WRI conducted the golden eagle surveys in accordance with this this guidance document.

MM BIO-1: Preconstruction Surveys

Preconstruction surveys will be conducted by USFWS-approved biologists according to the most current USFWS protocols, where available by species. These surveys will include surveying brush clearing areas and ground disturbance areas within habitat deemed suitable for sensitive species by a qualified biologist. As part of the pre-construction surveys, the composition of the vegetation community will be surveyed to establish baseline conditions prior to construction for post-construction restoration efforts. These surveys will be conducted for the presence of special-status plants, the presence of noxious weeds, and the presence of general and special-status wildlife species, to prevent direct loss of vegetation and wildlife and to prevent the spread of noxious plant species.

MM BIO-8: Reduce Night Lighting

Night lighting will be reduced in all natural areas to avoid unnecessary visual disturbance to wildlife. Night lighting during construction, operations, and maintenance will be reduced in natural areas using directed lighting, shielding methods, and/or reduced lumen intensity. The applicant will indicate anticipated measures to resource agencies for approval prior to construction. The approved measures will be provided to the California Public Utilities Commission.

MM BIO-10: Biological Monitors

Biological monitors will be provided throughout construction activities in all construction zones. A minimum of one monitor per crew is needed for construction crews using heavy equipment (e.g., backhoes, large trucks). One roving monitor will monitor multiple times per day in other active construction zones where heavy equipment is not in use.

MM BIO-15: Migratory Birds and Raptors Impacts Reduction Measures

To reduce impacts on migratory birds and raptors, the following will be completed:

Biological monitors will monitor and enforce disturbance buffers around all active bird nests (for raptors and species protected by the Migratory Bird Treaty Act (MBTA)) found in Project areas during construction. The general bird breeding season for this area is late February to early July. For raptors specifically, SCE will use the USFWS Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (2002) to determine appropriate survey areas (determined in consultation with the agencies) and disturbance buffers (0.5 miles for golden eagles and most other raptors) for active nests, except for burrowing owl nests, for which the applicant will be in compliance with the minimum distances outlined by the California Burrowing Owl Consortium Protocol (250 foot buffer around occupied nests during the breeding season). For all non-raptor bird species, biologists will survey within Project areas. Because there are no standardized disturbance buffers for active non-raptor bird nests, SCE will consult with the appropriate agencies (BLM, USFWS, CDFG, and NDOW) on a case-by-case basis when active nests are found in Project areas, unless directed to do otherwise by these same agencies.

Active bird nests will not be moved during breeding season, unless the Project is expressly permitted to do so by the USFWS, BLM, CDFG, or NDOW depending on the location of the nest.

All active nests and disturbance or harm to active nests will be reported within 24 hours to the USFWS, BLM, CDFG, and NDOW upon detection.

The biological monitor will halt work if it is determined that active nests would be disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.

Seasonal work stoppages may be required by NDOW for Project areas that pass the Wee Thump Joshua Tree Wilderness if construction activities occur within the breeding season. The applicant will consult with NDOW prior to construction.

As outlined by the *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006), the following avian safe practices will be employed during construction of the distribution lines associated with EITP: cover phase conductors with manufactured covers, include perch discouragers on crossarms and on top of poles, exceed the minimal distance between phase conductors to prevent electrocution by perched birds and their wingspan, utilize longer horizontal insulators, suspend phase conductors on pole top and cross arms, install horizontal jumper support to increase the phase-to-ground separation, replace tension members with fiberglass or non-conducting materials, cover tension members with dielectric material, utilize fiberglass poles or switches, and install standard nest discouragers.

COMPENSATORY MITIGATION

In the highly unlikely event a golden eagle mortality occurs as a result of this transmission line, SCE will work with the USFWS to identify appropriate compensatory mitigation to ensure that the net zero loss

standard is maintained. Potential compensatory mitigation measures available include: (1) placement of visual markers on the transmission line; (2) funding transmission line collision and electrocution studies to help inform future mitigation options; (3) based on results of transmission line collision and electrocution studies, work with the USFWS to determine how many miles of line should be marked/retrofit to offset eagle mortality; (4) funding the protection and long-term management of additional golden eagle nesting and/or foraging habitat. The compensatory mitigation selected by SCE to offset golden eagle mortality and ensure continued no net loss of golden eagle populations must receive the concurrence of the USFWS.

RISK ASSESSMENT

As a part of SCE's company-wide APP, SCE is performing risk assessments on its system as a whole for both electrocution and collision hazards. The purpose of these risk assessments will be to identify the highest risk areas within the SCE system and focus retrofit efforts in these areas. Because this Project is not expected to have a high risk of either electrocution or collision due to project design, a project-specific risk assessment will not be performed.

CONCLUSION

Electrocution and collisions of golden eagles as the result of implementing this Project are highly unlikely, and this issue will be addressed through compensatory mitigation in the very unlikely event the Project causes the take of an eagle. This Avian Mitigation and Monitoring Plan developed by SCE for this Project focuses on identifying golden eagle and other raptor territories and determining activity status. Appropriate buffers and coordination with the Wildlife Agencies will ensure the Project does not impact nesting success.

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Southern California Edison. 2011. Nesting Bird Management Plan: Tehachapi Renewable Tranmission Project Segments 4-11.

DRAFT

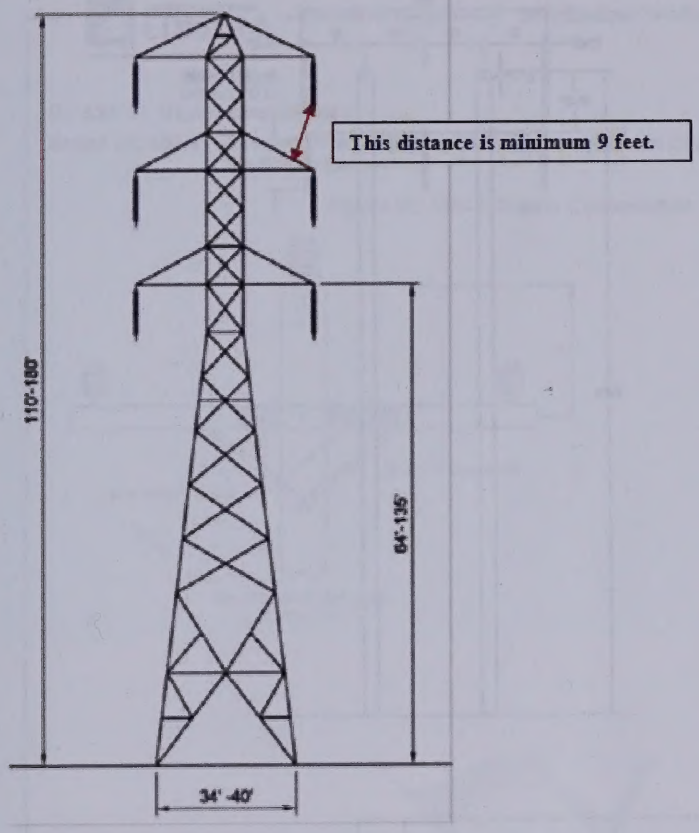
DUDEK

SOURCES: Aerial - Bing Maps 2009
Project Data - EPG Consultants 2008 & 2009

6567-00
MAY 2010

Eldorado-Ivanpah Transmission Project

FIGURE 1
Vicinity Map



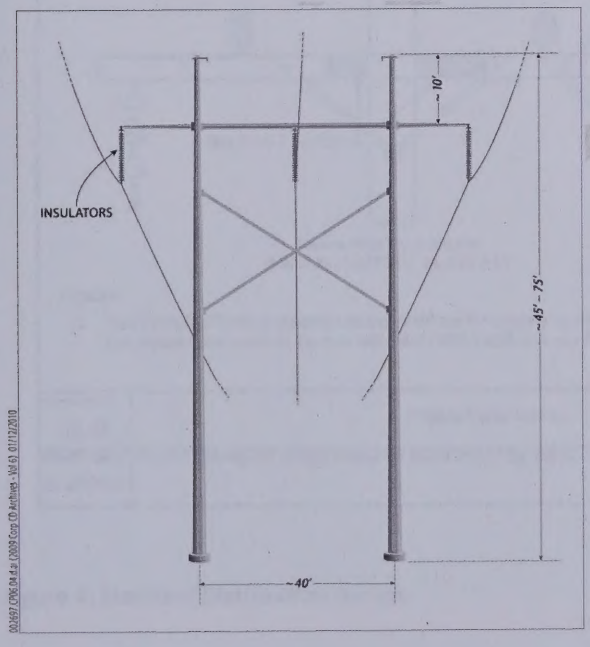


Figure 2: 220 kV Lattice Steel Tower (LST) Design

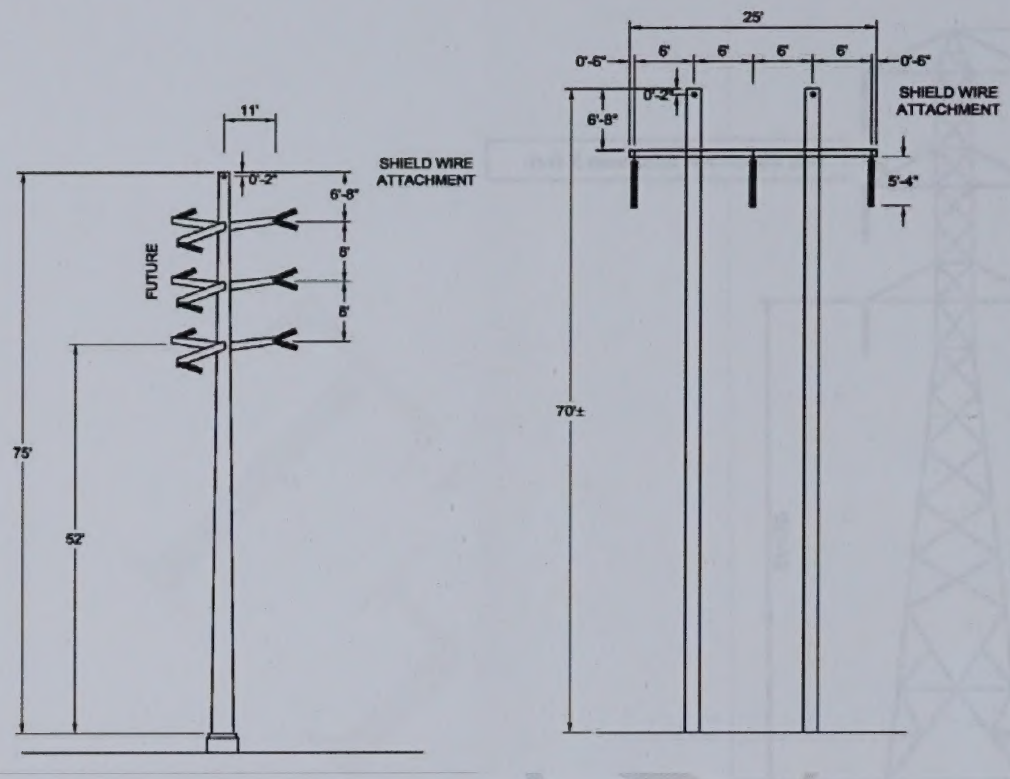


Figure 3: H-Frame Structure Design

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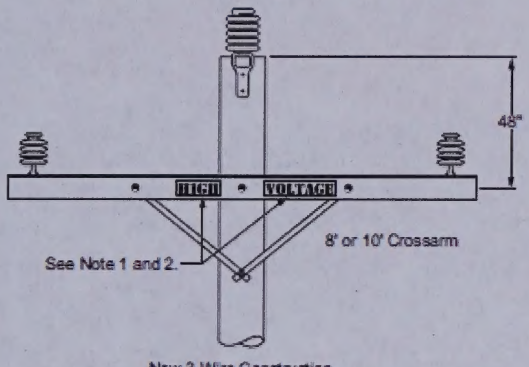
Distribution Overhead Construction Standards

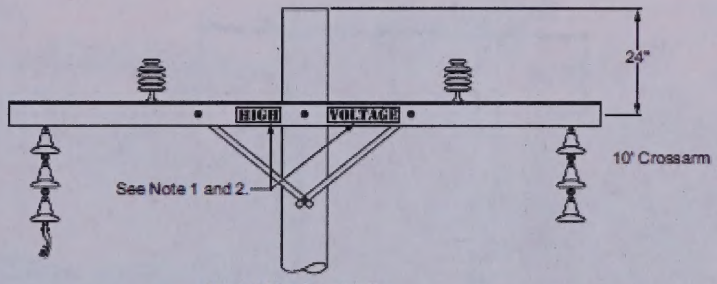
DC 535 Raptor Construction

Scope DC 535.1 Construction for Protection of Bald or Golden Eagles and Other Large, Rare, Predatory Birds

Figure DC 535–1: Raptor Construction



New 3-Wire Construction
12/34.5 kV



New 4-Wire Construction
6.9/12 kV, 9.5/16 kV, 14.4/24.9 kV

Note(s):

1. HIGH VOLTAGE signs mounted on crossarm are for existing installations only. For new or replacement of deteriorated sign installations, encircle the pole with HIGH VOLTAGE sign per PO 120.

Approved by:	Raptor Construction	DC 535
Effective Date: 04-27-2007	**What's Changed?** Added callout for HIGH VOLTAGE signs.	Sheet 1 of 2
		DOH

▸ SCE Internal ◂

Figure 4: Standard Distribution Designs

Figure 5 - Photographs of Existing Transmission Lines and Towers Along the EITP Route

Eldorado Valley, facing southwest toward McCullough Range with the pass in background. The existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV H-frame appears a bit fainter than the parallel set of larger towers for the LADWP transmission line in the same designated utility corridor.

On the west side of the McCullough Range, facing southwest toward the Lucy Greys (near left edge) and Sheep Mountain (right side); Clark Mountains in the distant background. The H-frame in the foreground is part of the existing 115kV line to be replaced. The other lines belong to various utilities.

Eldorado-Ivanpah Transmission Project

Raven Management Plan

Eldorado-Ivanpah Transmission Project

Raven Management Plan

Southern California Edison
Eldorado-Ivanpah Transmission Project
February 1, 2011

Raven Management Plan

Raven Management Plan (RMP): There is a potential for predation increase on the desert tortoise (DT) and other sensitive species by common ravens exploiting transmission towers for perching, roosting, and nesting. SCE will implement a Raven Management Plan (RMP) to minimize avian predation on DT for the Eldorado-Ivanpah Transmission Project (EITP, project). The purpose of the RMP is to utilize methods to deter raven depredation of juvenile desert tortoises, and other wildlife species. The RMP is not intended to eliminate or control raven populations, rather to target offending ravens that have been found to prey upon the DT. The RMP will incorporate an adaptive management strategy for immediate implementation following EITP construction. The RMP will be evaluated after three years of monitoring or as needed, depending on the survey findings and field conditions, or if avian predation becomes apparent. The following activities will be implemented as part of the RMP: (1) *Common Raven Nest/Power line Monitoring*, and (2) *Raven Control Contribution.* Mutual and timely cooperation between SCE and the Bureau of Land Management (BLM), U.S. Fish & Wildlife Service (USFWS) and state wildlife agencies (California Department of Fish and Game [CDFG] and Nevada Division of Wildlife [NDOW]) is central to effective implementation of the RMP.

Common Raven Nest/Power Line Monitoring: The name and qualifications of a Qualified Biologist(s) will be submitted to the BLM, USFWS, CDFG and NDOW for approval 30 days prior to commencement of monitoring each year. A Qualified Biologist(s) or USFWS/State-approved SCE designee with expertise identifying common raven nests and DT sign in DT modeled*, critical, and occupied habitat will conduct:

- Nest surveys will be performed once per month, between the 15th and last day of each month, during the primary common raven nest building period (February to May) and will begin the first common raven nesting season following the completion of construction in DT habitat. In the event that a common raven is documented initiating a new nesting attempt during the May surveys, follow up visits to that nest will be made in the subsequent months to establish whether or not the pair is bringing DT back to the nest. Surveying once per month is expected to identify potential nests prior to hatching of chicks, considering an incubation time of approximately 4 - 5 weeks. Nest removal by SCE would occur at the time of offending raven removal, depending upon impacts to personnel safety or system reliability. If eggs or chicks are found in a removed nest, the eggs or chicks would be humanely disposed of.
- Surveys for the presence of common raven nests on EITP tower structures and for the presence of DT remains within a 15-meter radius of each tower.
- Nest survey methods may include aerial surveys, vehicular windshield surveys or pedestrian surveys as appropriate.

- If DT remains are found below an active nest, SCE will document the remains and verify the nesting status of the common ravens (e.g., incubating, feeding nestlings) and notify the BLM, Service, and CDFG and/or NDOW verbally (via phone call) and in writing (via email or fax) within 24 hours of documenting the remains. SCE will mark or collect the DT remains after verification with the Service. Upon being notified, the Service will contact the Common Raven Management Working Group which will coordinate immediate removal of the offending common raven(s) in California.

In addition, SCE will establish a Cooperative Service agreement with USDA/APHIS facilitating Wildlife Services' (WS) performance of removal efforts of offending common raven(s) and nests on EITP structures. SCE will be responsible for expenses attributed to removal of common ravens and nests on EITP structures. The Cooperative Agreement would allow the removal of offending ravens and their nests through a depredation permit held by APHIS-WS. Nest removal of offending ravens will occur at the time of raven removal to the greatest extent possible depending upon impacts to personnel safety or system reliability. Also, at least once per year and outside of the avian breeding season and the DT's most active season, where personnel safety or system reliability does not pose a threat, SCE will remove all other raven nests (e.g., inactive or non-offending ravens) identified during the monthly surveys. SCE will dispose of nesting material so that it is no longer available for nest building (e.g., removal to a landfill, or disposal at a SCE facility). APHIS-WS intends to respond to nest removal within 2 - 3 days following notification of nest(s) identified on EITP tower structures belonging to offending raven(s). However, Agency response time may be limited by available personnel or other unavoidable factors out of the scope of this RMP. The joint Cooperative Agreement when prepared between SCE and APHIS-WS will establish working timeframes to manage ravens documented to negatively impact the DT.

The Qualified Biologist(s) or FWS-approved SCE designee will also conduct nest surveys at the Eldorado and Ivanpah substations.

- Surveys will begin in February and will continue through May, occurring between the 15th and last day of each month.
- If an active common raven nest is located, searches for the presence of DT remains within a 15-meter radius of the nest will be conducted.
- If DT remains are found, SCE will follow the same procedure outlined above; provided that personnel safety or system reliability is not of concern. Similarly, common ravens nesting on the substation facilities will be removed in accordance with the aforementioned procedures.

SCE will annually submit progress reports to the USFWS, BLM, CDFG and NDOW within 90 days of the years' last survey effort. The annual report would contain nest survey monitoring and raven removal results including GIS layer(s) of all the nests recorded / destroyed and ravens removed during the year. After three years of compiling nest survey and raven removal activities, an effectiveness evaluation of this conservation measure will be performed by SCE inclusive of identification of appropriate adaptive measures for SCE's implementation in the next breeding season. Based on the effectiveness of initial

conservation measures, SCE will implement adaptive management measures after timely consultation with the BLM, USFWS, CDFG, and NDOW.

The frequency and type of surveys implemented may increase or decrease depending on survey results and the effectiveness of monitoring and removal efforts. If avian predation concerns become apparent interim to the third-year RMP evaluation, adaptive measures addressing the situation would be identified and implemented with the agencies concurrence. Nest monitoring and common raven removal will be conducted for the life of the project or until SCE demonstrates, and the agencies agree, that any or all of these actions are no longer necessary based on the results of nest monitoring surveys and raven removals.

An evaluation of the effectiveness of this conservation measure will be reviewed by SCE, BLM, USFWS, CDFG, and NDOW on an annual basis in order to develop appropriate adaptive measures for EITP for the next breeding season. The frequency and type of surveys implemented may increase or decrease depending on survey results and the effectiveness of the monitoring and removal. SCE will implement adaptive management measures after consultation with the Service based on the effectiveness of conservation measures. Nest monitoring and removal, searches for desert tortoise remains, and common raven removal will be conducted for the life of the project or until SCE demonstrates, and the Service agrees, that any or all of these actions are no longer necessary based on the results of the nest monitoring surveys.

Raven Control Contribution: SCE will establish a contract with USDA/APHIS-WS and fund raven depredation activities.

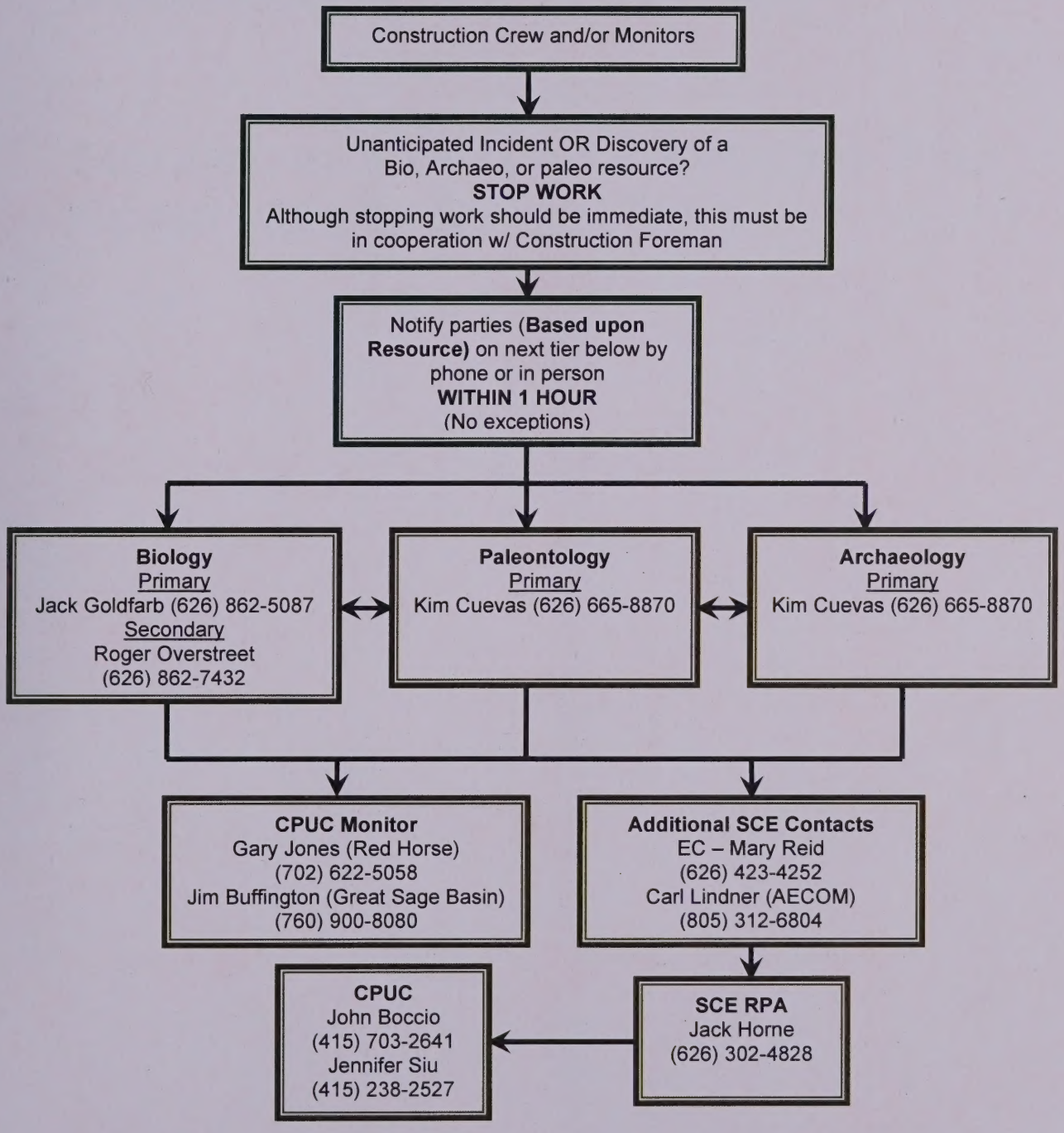
* http://pubs.usgs.gov/of/2009/1102/

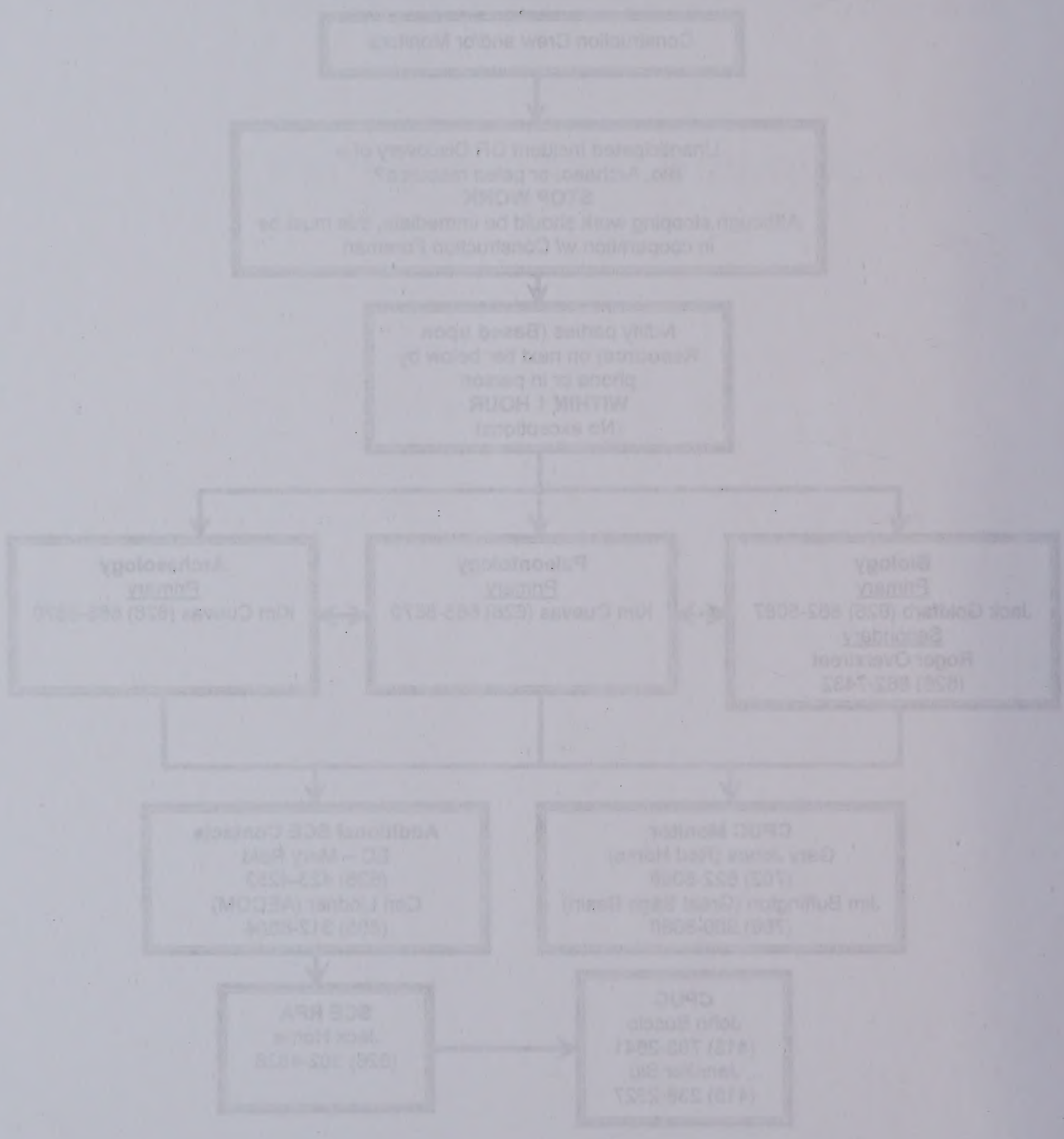
Eldorado-Ivanpah Transmission Project

Unanticipated Discovery Plan

Unanticipated Discovery Protocol

In the event an unexpected or unidentified resource is discovered, CEH&S will need to evaluate the discovery prior to the continuance of work. The communication protocol below outlines this process.





Colombo-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan
Nipton Material Storage Yard

Eldorado-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan
Nipton Material Storage Yard

SOUTHERN CALIFORNIA EDISON®

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STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
PER
CALIFORNIA 2009-0009-DWQ, Amended by 2010-0014 DWQ
FOR

ELDORADO-IVANPAH TRANSMISSION PROJECT
NIPTON MATERIAL STORAGE YARD

Adjacent to Nipton Rd
Nipton, CA 92364

Risk Level 1

Qualified SWPPP Developer (QSD)

AEI CASC CONSULTING

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(949) 453-1783

Date: August 9, 2011

Estimated Construction Dates:

Start Date: 09/01/2011 Completion Date: 8/31/2012

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SECTION 1
SWPPP REQUIREMENTS

1.1 Introduction

This SWPPP is written for a project with coverage under **STATE WATER RESOURCES CONTROL BOARD (SWRCB) ORDER NO. 2009-0009-DWQ as amended by 2010-0014-DWQ; GENERAL PERMIT NO. CAS000002** as a Risk Level 1 Project. (See risk assessment analysis in Appendix B.)

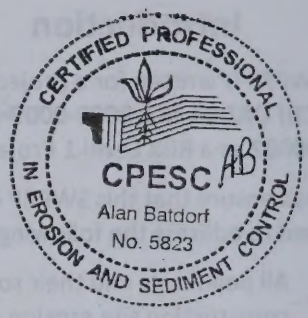
SCE shall ensure that this SWPPP is developed and amended or revised by a QSD. This SWPPP is designed to address the following objectives:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled.
2. Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated.
3. Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard.
4. Calculations and design details as well as BMP controls for site run-on are complete and correct.
5. Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

1.2 Certifications by Qualified SWPPP Developer

This SWPPP was developed by a Qualified SWPPP Developer (QSD):

AEI-CASC Consulting
Alan Batdorf
18 Technology Drive
Irvine, CA 92618
949/453-1783
Qualifications*: CPESC No. 5823, QSD CASQA Registration No. 221



Date: August 9, 2011

QSD Signature:

Print QSD Name: Alan Batdorf

QSD Title: Senior Scientist

*Include Qualifications and documentation of training in Appendix I, or stamp cover sheet.

1.2.1 SWPPP Certification by a Legally Responsible Person (LRP)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date: 9/12/11

Contact Signature: Don Johnson

Owner Name: Don Johnson

Owner Title: Manager 3, TDBU Major Projects Organization

1.2.2 Permit Registration Documents (PRDs)

To obtain coverage under the General Permit, dischargers are required to electronically file PRDs which includes a Notice of Intent (NOI), Risk Assessment, Site Map, Storm Water Pollution Prevention Plan, and Signed Certification Statement. In addition to electronically filed PRDs, the appropriate Annual permit fees shall be mailed to the SWRCB.

PRDs have been submitted to the SWRCB via the Stormwater Multiple Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP). Refer to Appendix B for a copy of the Project PRDs and Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP Availability and Implementation

The General Permit (Section XIV.C) requires the SWPPP be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawings will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone. **The SWPPP shall be implemented concurrently with the start of ground disturbing activities.**

1.4 SWPPP Amendments

The General Permit (Section VII.B.6) requires that this SWPPP be modified and amended to reflect any changes in construction or operations that may affect the discharge of pollutants from the construction site to surface waters, ground waters, or the municipal separate storm sewer system (MS4). The SWPPP will also be amended if it is in violation of any condition of the Permit or has not achieved the general objective of reducing pollutants in storm water discharges. SWPPP Amendments will be prepared by a Qualified SWPPP Developer (QSD). The QSP shall notify the LRP or the QSD if an amendment to the SWPPP is required. SWPPP Amendments will be dated, signed by the QSD, and directly attached to the SWPPP. Refer to Appendix C, for the SWPPP Amendment Log and corresponding Amendment Documents.

1.5 Retention of Records

The General Permit (Sections I.J.69 and IV.G) requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed. SCE shall furnish the RWQCB, SWRCB, or US Environmental Protection Agency (EPA), within a reasonable time, any requested information to determine compliance with this General Permit. Records shall be retained for a minimum of three years for the following items:

- Site inspections
- Compliance certifications
- Discharge reports
- Approved SWPPP document and amendments

1.6 Required Non-Compliance Reporting

The General Permit (Section I.J.) identifies several areas of non-compliance reporting. It is the responsibility of SCE to properly document reportable discharges or other violations of the General

Permit. Exceedances and violations will be reported using the SMARTS system and include the following:

- Self-reporting of any other discharge violations or to comply with RWQCB enforcement actions; and
- Discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR §§ 117.3 and 302.4, and those defined by California regulation or statute, unless a separate NPDES Permit has been issued to regulate those discharges.

If an illegal discharge occurs or if the project receives a written notice or order from any regulatory agency, the QSP will immediately notify the TDBU E-SES and LRP, and will file a written report to the SCE-TDBU SWPPP Coordinator within 7 days of the discharge event, notice, or order, and the LRP will file compliance documentation as required per the General Permit, to the Regional Water Quality Control Board (RWQCB) via the SMARTS system. Corrective measures will be implemented immediately following the discharge, notice, or order. The report will contain the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge, including the cause or nature of the notice or order;
- The control measures (BMPs) deployed before the discharge event, or prior to receiving notice or order;
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence; and
- An implementation and maintenance schedule for any affected BMPs.

1.7 Annual Report

SCE is responsible for preparing, certifying, and electronically submitting an Annual Report for this Project if it remains under General Permit coverage for at least three (3) months. The Annual Report shall be filed prior to submitting a Notice of Termination (NOT) for this Project, but no later than September 1st of each year. Reporting requirements are identified in Section XVI of the General Permit and include providing a summary of the following:

1. A summary and evaluation of all sampling and analysis results, including copies of laboratory reports.
2. The analytical method(s), method report unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").
3. A summary of all corrective actions taken during the compliance year.
4. Identification of any compliance activities or corrective actions that were not implemented.
5. A summary of all violations of the General Permit.
6. The names of individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements.
7. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including any required precipitation (rain gauge) recordings.

8. Documentation of all training for individuals responsible for all activities associated with compliance with this General Permit.
9. Documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair.
10. Documentation of all training for individuals responsible for overseeing, revising, and amending the SWPPP.

1.8 Changes to Permit Coverage

The General Permit (Section II.C) includes provisions allowing the revision of total acreage covered by the General Permit when a portion of the site is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the site is sold to a different entity; or when new acreage, subject to the General Permit, is added to the site.

Within 30 days of a reduction or increase in total disturbed acreage, SCE will electronically file revisions of PRDs that include a certified Change of Information (COI), revised site map, SWPPP revisions, as appropriate, and, if applicable, certification that new landowners have been notified of applicable requirements to obtain permit coverage (including name, address, phone number, and e-mail address of new landowner) in accordance with requirements of the General Permit. Refer to Appendix C for the SWPPP Amendment Log and PRD changes.

1.9 Notice of Termination

Prior to submitting a Notice of Termination (NOT) an annual report must be submitted (see Section 1.7). Within 90 days of when construction is complete or ownership has been transferred, SCE shall electronically file an NOT, a final site map, and photos via SMARTS, to terminate coverage under the General Permit. Construction is considered complete only when all portions of the site have been transferred to a new owner, or all of the following conditions are met:

- The site will not pose any additional sediment discharge risk than it did prior to construction activity;
- There is no potential for construction-related storm water pollutants to be discharged into site runoff;
- Final stabilization has been reached;
- Construction materials and wastes have been disposed of properly.

Final Stabilization for the purposes of submitting an NOT is satisfied when all soil disturbing activities are completed and one of the following criteria is met:

- 70% final cover method (photos required; no computational proof required); or
- RUSLE/RUSLE2 method (computational proof required); or
- Custom method (discharger demonstrates that site complies with final stabilization).

SECTION 2
PROJECT SITE INFORMATION

2.1 Project Overview

The Southern California Edison (SCE) Nipton Material Storage Yard (Project) is a component of an overall larger project: The Eldorado-Ivanpah Transmission Project (EITP), a Linear Underground/Overhead Project. This SWPPP describes the storm water best management practices to be implemented at the Nipton Material Storage Yard and is being developed separately because of diverse geographical areas, construction phasing, as well as different contractors associated with the EITP. The EITP traverses two states: California and Nevada and the construction activities include transmission upgrades and associated transmission infrastructure submitted by SCE to the California Public Utilities Commission (CPUC) and the Bureau of Land Management (BLM). SCE proposes to construct, operate, and maintain new and upgraded transmission facilities to deliver electricity from several solar energy facilities proposed to be built in the Ivanpah Valley area. The upgraded transmission lines would extend approximately 35 miles from southern Clark County, Nevada, to northeastern San Bernardino County, California. Approximately 28 miles of the EITP are in Nevada, with the remaining 7 miles in California.

2.1.1 Project Site Activities

This Nipton Material Storage Yard is being developed to serve as a Project-temporary material storage area that will be utilized during construction activities associated with the telecommunication activities of the western portion of the EITP. The Project is located in California, within the jurisdiction of the Lahontan Regional Water Quality Control Board (6B) in eastern San Bernardino County, southwest of the Nipton Road and Nipton Moore Road intersection. The approximate location of the Project is latitude 35.46546° and longitude -115.27397°.

This yard will be used as a reporting location for workers, material storage, a helicopter staging area, and vehicle equipment parking. The main construction activities associated with this Project include rough grading/clearing operations, temporary storage of native cacti marked for relocation, and the possible installation of the following Project elements: vehicle storage areas, temporary vehicle and equipment fueling areas; helicopter pad and parking areas; 6-foot high chain-link fencing with privacy screening; construction trailer; restrooms; and generator lighting.

Upon completion of telecommunication construction activities of the EITP, the Nipton Material Storage Yard will be removed and the site returned to pre-existing conditions or equivalent. Total disturbed area for the Nipton Material Storage Yard is 10 acres.

2.1.2 Vicinity Map

Refer to Appendix B for Project Vicinity Map.

2.2 Project Flows

Generally, the Project's terrain is relatively flat with a slight gradual westerly slope, and will remain unchanged by this Project. Existing flows move across the site in a westerly direction for approximately 5 miles before ultimately discharging to Ivanpah Lake, an existing dry lake bed. Ivanpah Lake is not listed on the 2010 303(d) list and has no established TMDLs. The Project is not located in an environmentally sensitive area.

2.2.1 Storm Water Run-On from Offsite Areas

During construction activities, flows will be either intercepted and/or redirected around active construction areas and then allowed to continue along their existing path of travel. BMPs selected to control run-on from discharging sediment on the construction site are described in Section 3.5.2.

2.3 Project Risk Assessment

A project's risk assessment is dependent on the project's location in proximity to receiving waters, impairments of the receiving waters, the timeline for construction activities, and site characteristics. Project risk level is determined from the following:

- Sediment Risk – the relative amount of sediment that can be discharged, given the above mentioned factors.
- Receiving Waters Risk – the risk that sediment discharges pose to a project's receiving waters.

See table 2-1 for the Project's sediment risk assessment and Table 2-2 for the Project's receiving waters risk assessment.

Table 2-1
Risk Assessment

Summary of Sediment Risk		
RUSLE Factor	**Value**	**Method for establishing value**
R	10	EPA NPDES Rainfall Erosivity Factor Calculator
K	0.17	SWRCB Map
LS	3.66	SWRCB Map
Total Predicted Sediment Loss (tons/acre)		6.22
Overall Sediment Risk: – Low Sediment Risk < 15 tons/ acre – Medium Sediment Risk >= 15 and < 75 tons/acre – High Sediment Risk >= 75 tons/acre		☒ Low ☐ Medium ☐ High

Summary of Receiving Water Risk			
Receiving Water Name:	**303(d) Listed for Sediment Related Pollutant[1]**	**TMDL for Sediment Related Pollutant[1]**	**Beneficial Uses of COLD, SPAWN, and MIGRATORY[1]**
Ivanpah Lake	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
Overall Receiving Water Risk			☒ Low ☐ High

(1) If yes is selected for any option the Receiving Water Risk is High

Table 2-2
Risk Level Determination

Combined Risk Level Matrix		Sediment Risk		
		☒Low	☐Medium	☐High
Receiving Water Risk	☒Low	Level 1	Level 2	
	☐High	Level 2		Level 3

Based on the low sediment risk level assessment and the low receiving waters risk assessment, the Project is determined to be a Risk Level 1 project as shown in Table 2-2 above. A copy of the Risk Level determination documents (PRDs submitted to SMARTS) is included in Appendix B.

2.4 Construction Schedule

A project schedule has been developed and is provided below. BMP deployment will begin concurrently with ground disturbance activities. The schedule includes the following:

- Estimated Project Start Date: 9/01/11
- Estimated Yard Ready to Receive Materials: 12/21/11
- Estimated Project Completion Date: 8/31/12

2.5 Potential Construction Site Pollutant Sources

SCE will utilize the control practices identified for each activity that are identified in Section 3 and on the Site Map to minimize or eliminate potential pollutants from discharging from the construction site. The following sections identify potential pollutant sources associated with the Project.

Appendix F includes a copy of the fact sheets of all the BMP's selected for this Project. Implementation and location of BMPs are shown on the Site Map in Appendix B. Narrative descriptions of BMPs which will be used during the overall Project are listed by category in Section 3 of this SWPPP.

2.5.1 Construction Materials

The following is a list of construction materials that may be used which may have the potential to contribute to pollutants in storm water discharges:

- Vehicle fluids, including oil, grease, petroleum, and coolants
- Cement materials associated with concrete operations for fencing installation
- Base and sub base material (may include electrical wiring)
- Concrete curing compounds
- BMP materials
- Treated lumber (materials and waste)
- PCC rubble

- General litter
- Wood products
- Metals and plated products
- Fertilizer, herbicides and pesticides (if necessary)

2.5.2 Construction Wastes

The following is a list of solid or construction wastes that may be created which may have the potential to contribute to pollutants in storm water discharges:

- Solid waste generated from removal of trees and shrubs
- Packaging materials including wood, paper and plastic
- Scrap metals
- Plastic
- Food wastes
- Timber
- Steel
- Electrical cuttings
- Non-hazardous equipment parts
- Styrofoam
- Hazardous wastes
- Concrete wastes

2.5.3 Construction Activities

The following is a list of construction activities that may be performed which may have the potential to contribute to sediment in storm water discharges:

- Rough grading/clearing operations
- Post hole auguring and fence installation
- Stockpiling (if necessary)
- Vehicle and equipment maintenance

2.5.4 Other Pollutants Sources

Table 2-3
Construction Activity and Associated Pollutants

Activity Type		Pollutant	Visually Observable
Soil Disturbance:			
☒	Rough grading/Clearing	Sediment and organics	Cloudy to opaque
☒	Base Material installation	Sediment	Cloudy to opaque
☐	Fine Grading	Sediment	Cloudy to opaque
☒	Trenching (post hole auguring)	Sediment	Cloudy to opaque
☒	Stockpiling (if necessary)	Sediment	Cloudy to opaque
Asphalt:			
☐	Street Construction	Hydrocarbons	Oily sheen
☐	Street Improvements	Hydrocarbons	Oily sheen
☐	Street Demolition	Hydrocarbons	Oily sheen
Concrete Laden Liquid:			
☐	Curb & Gutter	pH	Cloudy to milky
☐	Sidewalks	pH	Cloudy to milky
☒	Foundations/post installations	pH	Cloudy to milky
☐	Driveways	pH	Cloudy to milky
☐	Medians	pH	Cloudy to milky
☐	Stuccoing	pH	Cloudy to milky
☐	Grouting	pH	Cloudy to milky
☒	Washouts/Clean up	pH	Cloudy to milky
General:			
☐	Framing	Sawdust	Yes
☐	Painting	Paint (when wet)	Yes
☐	Dry Walling	Gypsum/Joint Compound	Yes
☐	Tiling	Ceramic dust	Yes
☐	Cabinet Building/Installing	Sawdust	Yes
☐	Plumbing	PVC Glue (when wet)/Plastic	Yes
☒	Wiring/Electrical Utilities	Copper/Plastic/Metals	Yes
☐	Heating/Air Conditioning	Sheet metal/fiberglass wool	Yes
☐	Landscaping	Containers/mulch/soil	Yes

Table 2-4
Equipment used During Construction

Equipment Type			
☒	Backhoe loader(s)	☒	Fork & Rough-terrain lifts (Pettibone)
☒	Water truck(s)	☒	Generator(s)
☐	Scraper(s)	☐	Concrete boom pumps
☒	Loader(s)	☐	Concrete pumps
☒	Bulldozer(s)	☐	Asphalt planer / grinder
☐	Motor-grader	☐	Asphalt paving machine
☐	Excavator(s) / Track hoe(s)	☐	Street striping equipment
☐	Dump trucks (10-wheel)	☒	Building material delivery trucks
☒	Belly/Bottom dumps (tractor/trailer)	☒	Personal cars and light trucks
☐	Tractor: skip loader	☒	Waste hauling trucks
☐	Skid steer loaders (Bobcat)	☐	Trencher(s)
☐	Concrete delivery trucks	☐	Stucco/Plaster spray pumps
☒	Portable concrete mixers	☐	Spray paint equipment (airless)
☒	Compaction equipment	☐	Other

Table 2-5
Potential Construction Site Pollutants

Yes	Material Type	Pollutant	Visually Observable	Typical Location
☒	Diesel Fuel	Petroleum distillates, naphthalene, xylene	Sheen/Stain	Material storage area
☒	Gasoline	Benzene, toluene, xylene, MTBE	Sheen/Stain	Material storage area
☒	Hydraulic Oil	Mineral oil, trace additives	Sheen/Stain	Material storage area
☒	Engine Oil	Mineral oil, additives, combustion byproducts	Sheen/Stain	Material storage area
☒	Transmission Oil	Mineral oil, trace additives	Sheen/Stain	Material storage area
☒	Engine Coolant	Ethylene and propylene glycol, heavy metals	Green/red	Material storage area
☒	Grease	Petroleum hydrocarbons	Sheen/Stain	Material storage area
☐	Kerosene	Petroleum hydrocarbons	Sheen/Stain	Material storage area
☐	Fertilizer	Nitrogen, phosphorus	No	Material storage area
☒	Pesticide	Water-insoluble chlorinated hydrocarbons, organophosphates, carbonates, and pyrethrums.	Varies	Material storage area
☒	Herbicide	Chlorinated hydrocarbons, organophosphates	Varies	Material storage area
☐	Soil Amendments		No	Material storage area
☒	Concrete (wet)	Fly ash, heavy metals, Portland cement	White solid	Streets & building pads
☐	Concrete coring slurry	Turbidity and pH	Gray liquid	Building construction & streets
☐	Concrete sawing slurry	Turbidity and pH	Gray liquid	Building construction & streets
☒	Cement	Aluminum calcium iron oxide, calcium sulfate	Gray powder	Material storage area
☐	Drywall joint compound	Pigment, vinyl acetate	White putty	Building construction
☐	Grout	Silica sand, Portland cement	White powder	Block wall & Building construction
☐	Paint	Ethylene glycol, titanium oxide, VOC	Colored liquid	Building construction
☐	Sealers	Diacetone alcohol,		Building construction & Streets
☐	Adhesives	COD/ Phenols/ SVOC	White/yellow	Building construction
☒	Sanitary waste	Human waste	Yes	Staging areas & all construction areas
☒		Animal waste	Yes	All areas
☐	Asphalt	Asphalt fumes, cutback asphalt,	Black material	Streets

Yes	Material Type	Pollutant	Visually Observable	Typical Location
☒	Curing Compounds	Glass Oxide, urea-extended phenol	Creamy white	Material storage area
☒	Waste wash water	Residuals and modifications to pH	Suds, foam, froth	Material storage area
☐	Wood Preservatives	Arsenic, Chromium (Total), Copper, and Zinc	Amber liquid	Building construction
☒	Cleaning Solvents	Perchloroethylene, methylene chloride, TCE	Varies	Material storage area
☒	Sediment	Soil, turbidity, dust	Muddy	Material storage area
☒	Vegetation	Organic matter	Yes	Material storage area
☒	Solid Waste	Floatable and blowable trash and debris	Yes	Material storage area
☐	Tile			Building construction & material storage areas
☐	Historic land use contaminants (if applicable)			

2.6 Identification of Non-Storm Water Discharges

Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, and other discharges not subject to a separate NPDES permit adopted by a Regional Water Board. The discharge of non-storm water is authorized under the following conditions:

1. The discharge does not cause or contribute to a violation of any water quality standard;
2. The discharge does not violate any other provision of the General Permit;
3. The discharge is not prohibited by the applicable Basin Plan;
4. SCE has included and implemented specific BMPs required by this General Permit to prevent or reduce the contact of the non-storm water discharge with construction materials and equipment;
5. The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities or pollutants; and
6. SCE reports the sampling information in the Annual Report.

Authorized non-storm water discharges associated with this Project may include the following de-chlorinated sources:

- Water to control dust

Refer to Section 3.3 for a description of BMPs selected to address non-storm water discharges.

SECTION 3
BEST MANAGEMENT PRACTICES

3.1 Schedule for BMP Implementation Specific for this Project

Table 3-1
BMP Implementation Schedule

BMP Description	Estimated Timeline of Activity Estimated Project Start Date: 09/01/11 Estimated Project Completion Date: 08/31/12	
EC-1 Scheduling	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
EC-2 Preservation Of Existing Vegetation	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
EC-5 Soil Binders	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
EC-7 Geotextiles and Mats	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-1 Material Delivery and Storage	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-2 Material Use	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-3 Stockpile Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-4 Spill Prevention and Control	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-5 Solid Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-6 Hazardous Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-8 Concrete Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization

Table 3-1
BMP Implementation Schedule

BMP Description	Estimated Timeline of Activity Estimated Project Start Date: 09/01/11 Estimated Project Completion Date: 08/31/12	
WM-9 Sanitary/Septic Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-1 Water Conservation Practices	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-6 Illicit Connection/Discharge	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-7 Potable Water/Irrigation	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-9 Vehicle and Equipment Fueling	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-10 Vehicle and Equipment Maintenance	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-12 Concrete Curing	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-13 Concrete Finishing	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
SE-1 Silt Fence	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
SE-5 Fiber Rolls	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
SE-6 Gravel Bag Berm	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
SE-7 Street Sweeping and Vacuuming	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
TC-1 Stabilized Construction Entrance/Exit	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization

Table 3-1
BMP Implementation Schedule

BMP Description	Estimated Timeline of Activity Estimated Project Start Date: 09/01/11 Estimated Project Completion Date: 08/31/12
WE-1 Wind Erosion Control	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization

Copies of BMP fact sheets specific to this project are located in Appendix F. The following good housekeeping measures should be implemented onsite for the duration of the project:

1. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).
2. Cover and berm loose stockpiled construction materials that are not actively being used.
3. Store chemicals in water tight containers (with appropriate secondary containment to prevent any spillage and leakage in a completely enclosed storage shed. Implement WM-2.
4. Minimize exposure of construction materials to precipitation.
5. Implement BMPs to prevent of-site tracking of loose construction and landscape materials.
6. Prevent the disposal of rinse or wash waters or materials on impervious site surfaces or into the storm drain.
7. Ensure the containment of sanitary facilities to prevent discharges of pollutants to the storm water drainage system or receiving water.
8. Regularly inspect sanitation facilities and clean or replace them as needed.
9. Cover waste disposal containers at the end of every business day and during rain events.
10. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.
11. Contain and securely protect stockpiled waste materials from wind and rain at all times unless actively being used.
12. Implement procedures to effectively address hazardous and non-hazardous spills.
13. Maintain equipment and materials for clean-up of spills on-site. Contain leaks and clean up spills immediately. Properly dispose of all spilled materials.
14. Contain all washouts so that there is no discharge into the underlying soil and onto the surrounding areas.
15. Prevent oil, grease, or fuel from leaking in to the ground storm drains or surface waters.
16. Immediately clean up all leaked material and dispose of properly.

17. Contain stockpiled materials including mulches and topsoil when they are not actively being used.
18. Contain fertilizers and other landscape materials when they are not being actively used.
19. Discontinue the application of any erodible landscape material within two days before a forecasted rain event of during periods of precipitations.
20. Apply erodible landscape materials at quantities and application rates according to manufacturer's recommendations based on written specifications by knowledgeable and experienced field personnel.
21. Stack erodible landscape materials on pallets and cover when not being used or applied.
22. Implement measures to control all non-storm water discharges during construction.
23. Limit washing vehicles on-site to emergency situations only. Prevent non-storm water discharges from vehicle washing from reaching surface waters or the MS4 drainage system.
24. Prevent un-authorized non-storm water discharges from reaching surface waters or the MS4 drainage system when cleaning streets.
25. Implement effective wind erosion control BMPs.
26. Provide soil cover for areas of construction that have been disturbed and are not scheduled to be re-disturbed for at least 14 days and for all finished slopes, open space, utility backfill, and completed lots.
27. Limit the use of plastic materials when more sustainable environmentally friendly alternatives exist.
28. Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to control erosion and sediment discharges from the site.
29. Conduct regular storm water tailgate meetings with the workforce when the project is staffed and work is underway.

3.2 Housekeeping

3.2.1 Construction Materials

An inventory of construction materials and activities is provided in Sections 2.5.1 and 2.5.3, respectively. Implementation and locations of some materials handling control BMPs are shown on the Site Map(s) in Appendix B. The BMPs that have been selected to handle material controls on the construction site areas are:

- **WM-1 – Material Delivery and Storage and WM-2 Material Use**

  The material delivery, storage and usage area will be located within the Project site area as shown on the Site Map in Appendix A. In the event this area is relocated or additional areas are added, the QSP, or designated personnel, shall update the Site Map to show respective locations.

  SCE will utilize stabilized areas, as necessary, to prevent potential spills and unnecessary tracking of sediment. Vehicles, including field buggies, shall be stored in proper designated vehicle storage areas to prevent discharges of vehicle fluids (also see NS-10). Chemicals will be stored in watertight containers equipped with secondary containment or stored inside a storage shed.

Spill clean-up materials, material safety data sheets, material inventory, and emergency contact numbers will be maintained and stored onsite by SCE.

- **WM-3 – Stockpile Management**

  Stockpiles during construction of this Project are not anticipated, however, if stockpiling does become necessary, SCE will update the Site Map to show their respective locations. Stockpile management should consist of the following:

  - Stockpiles should be located away from concentrated flows of storm water and drainage courses.
  - Stockpiles require proper wind erosion control. See WE-1-Wind Erosion Control for specifics of this BMP.
  - All stockpiles shall be covered or protected with perimeter sediment control prior to the onset of precipitation.

3.2.2 Waste Management Controls

An inventory of construction wastes is provided in Section 2.5.2. Implementation and field locations of waste management control BMPs shall be shown on the Site Map(s) in Appendix B. The BMPs that have been selected to handle materials and control construction wastes are:

- **WM-5 – Solid Waste Management**

  SCE shall implement this BMP whenever wastes are generated, stockpiled, or removed from the Project. Implementation of this BMP will minimize or eliminate the discharge of pollutants to the storm drain systems or watercourses.

  This BMP will be implemented to minimize storm water contact with waste materials and prevent waste discharges. Waste containers shall be equipped with functional lids and covered at the end of every business day and during rain events. Solid waste, mostly shrubs, will be removed and disposed of at appropriate offsite facilities weekly.

- **WM-6 – Hazardous Waste Management**

  SCE shall implement this BMP to prevent or reduce the discharge of hazardous materials to stormwater or watercourses. SCE shall place hazardous materials in a non-permeable, waterproof spill containment bin and provide training of employees and subcontractors.

- **WM-8 – Concrete Waste Management**

  Temporary concrete washout facilities will be placed within the Project area and shown on the Site Map. They will be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations and placed a minimum of 50 feet from existing water courses, and apart from construction traffic areas. A sign shall be installed adjacent to the washout facility to inform concrete equipment operators to utilize the proper facilities.

- **WM-9 – Sanitary/Septic Waste Management**

  SCE shall minimize or eliminate the discharge of construction sanitary/septic wastes. This BMP is applicable to temporary and portable sanitary/septic systems on construction sites and associated areas. Portable toilets will be placed within the Project area as shown on the Site Map. Should locations change, or if additional portable toilets are necessary, the QSP, or designated personnel, shall update the Site Map. Weekly maintenance shall be provided and wastes will be properly disposed of at appropriate offsite facilities. The toilets will be located away from concentrated flow paths and traffic flow.

3.2.3 Vehicle Storage and Maintenance Controls

An inventory of construction activities is provided in Section 2.5.3. Implementation and locations of vehicle storage and maintenance control BMPs will be field located and the Site Map(s) updated to show their respective locations. The BMPs that have been selected to handle vehicle storage and maintenance for the Project are:

- **NS-9 – Vehicle and Equipment Fueling**

  This BMP will be utilized to manage onsite fueling activities. A temporary fueling area may be constructed within the Project site; the Site Map will be updated to indicate the location. Fuel trucks, each equipped with absorbent spill clean-up materials, will be used for all onsite fueling, whether at the temporary fueling area or for mobile fueling elsewhere on the site. All mobile fueling operations will be conducted at least 50 ft away from operational inlets and drainage facilities and on a level graded area. Drip pans will be used for all mobile fueling.

- **NS-10 – Vehicle and Equipment Maintenance**

  Several types of vehicles and equipment will be used throughout the Project, including trucks and trailers, backhoes, forklifts and generators. This BMP will be utilized to prevent discharges of vehicle fluids during maintenance activities.

  All vehicle maintenance will be conducted at least 50 ft away drainage courses and on a level graded area. SCE will place drip pans, plastic sheeting, or absorbent material under vehicles and equipment while parked overnight, in storage, and when requiring maintenance activities that involve grease, oil, solvents, or other vehicle fluids.

  Construction vehicles and equipment will be serviced and stored onsite in the area as shown on the Site Map. If this area requires change due to construction phasing, the QSP, or designated personnel, shall update the Site Map to show its new location.

3.2.4 Landscape Materials

No landscape materials are intended for use in construction of this Project.

3.3 Non-Storm Water Management

3.3.1 Non-Storm Water Controls

An inventory of construction activities and potential non-storm water discharges is provided in Sections 2.5.3 and 2.6. Implementation and locations of some non-storm water control BMPs are shown on the Site Map(s) in Appendix B. The BMPs that have been selected to control non-storm water pollution for the Project are:

- **NS-1 – Water Conservation Practices**

SCE shall use water in a manner, which will not cause erosion or transport pollutants off-site. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

- **NS-6 – Illicit Connection/Discharge**

  SCE shall use this BMP on all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

- **NS-7 – Potable Water/Irrigation**

  SCE shall implement this BMP whenever potable water or irrigation water discharges occur at, or enter a construction site.

- **NS-12 – Concrete Curing**

  Discharges of stormwater and non-stormwater exposed to concrete curing may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-12, to reduce or eliminate the contamination of stormwater runoff during concrete curing operations.

- **NS-13 – Concrete Finishing**

  Discharges of stormwater and non-stormwater exposed to finishing operations may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-13, to reduce or eliminate the contamination of stormwater runoff during concrete finishing operations.

3.3.2 Vehicle and Equipment Cleaning

Vehicle and equipment cleaning operations are not planned on this Project.

3.3.3 Spill Response

SCE shall implement WM-4, Spill Prevention and Control, and the following measures to address hazardous and non-hazardous spills at the Project site:

- Maintain equipment and spill clean-up materials available on-site, including, but not limited to shovels, brooms, spill absorbent, rags, and proper waste containment (i.e. non-permeable, water proof spill containment bin). Waste materials shall be labeled and disposed of properly in accordance with local, state, and federal requirements.
- Maintain Project-specific material safety data sheets, material inventory, and emergency contact numbers on-site.
- In the event of a leak or spill of hazardous substances used, stored, or generated on-site, implement proper spill clean-up procedures to prevent pollutant discharges to storm drain systems. Spills of oil, petroleum products, and substances listed under 40 CFR parts 11, 117, and 302, and sanitary and septic wastes shall be contained and cleaned up immediately.

Also, refer to Attachment F for related BMP guidance factsheets:

- WM-4 – Spill Prevention and Control
- WM-5 – Solid Waste Management

- WM-6 – Hazardous Waste Management
- WM-9 – Sanitary/Septic Waste Management

Note: For this Project, **Patriot Environmental** has been identified, by SCE, as the primary spill clean-up responder, as well as for other waste discharge incidents.

The notification process will be from the person or entity causing or discovering the incident to the SCE–TDBU SWPPP Coordinator, John Slayton, then to the on-call TDBU E-SES (via the SCE operator) and finally to Patriot Environmental. There is always the possibility that Patriot Environmental may get a call directly from any of the preceding, and Patriot Environmental has been requested to take the call, and then to confirm with the on-call E-SES the person making the notification to them.

- John Slayton's Cell Phone Number: 310-990-1745
- TDBU E-SES Contact Number: 626-302-1212 (Ask for On-Duty TDBU Environmental Specialist)
- Patriot Environmental: 800-624-9136 (Dispatch 24 hr. Contact)

3.4 Erosion Controls

Erosion control consists of source control measures that are designed to prevent soil particles from detaching and becoming suspended in storm water runoff. This Project will incorporate, at a minimum, temporary erosion control measures required by the General Permit, and other measures selected by SCE.

- **EC-1 – Scheduling**

  SCE shall reduce the discharge of pollutants to water courses caused by construction activities by scheduling activities in a manner that will limit exposure of disturbed soil to wind, rain, and storm water run-on and runoff.

- **EC-2 – Preservation of Existing Vegetation**

  SCE will be removing all vegetation within the fenced area, however the root systems will remain in place to maintain soil stabilization. SCE shall preserve and protect existing vegetation adjacent to work areas. The protection and preservation of such vegetation will serve to control erosion and filter out sediment.

Implementation and locations of temporary erosion control BMPs are shown on the Site Map(s) in Appendix B and described in this section. The BMPs that will be implemented to control erosion for this Project are:

3.4.1 Wind Erosion Controls

The Project is located in an area common to high wind velocities. At a minimum, the Project shall implement screening of fencing and the following BMP to control dust for this Project:

- **WE-1 – Wind Erosion Control**

  This BMP, along with NS-1 – Water Conservation Practices, will be implemented to provide Dust Control and prevent discharges from dust control activities and water supply equipment. Water will be applied to disturbed soil areas of the Project to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Water equipment leaks will be repaired immediately. Water application rates will be minimized, as necessary, to prevent runoff and ponding. Water for dust control will be obtained from Molycorp.

3.4.2 Inactive Areas and Finished Slopes

The Project area is relatively flat and does not include any slopes requiring protection. It is expected that construction activities will be scheduled such that disturbed areas will be active until final stabilization is complete. For disturbed areas that remain inactive (not scheduled to be re-disturbed for at least 14 days) the following BMPs have been selected to control erosion:

- **EC-5 – Soil Binders**

  SCE shall apply temporary erosion controls to disturbed areas where applicable, to reduce soil erosion from wind and rain. SCE shall appropriately select soil binders that are texture specific to the site's soil conditions and conform to the local municipality's specifications. SCE shall avoid application during or 24-hours prior to rainfall.

- **EC-7 – Geotextiles and Mats**

  SCE shall implement one or more of these measures to stabilize disturbed soil areas (stockpiles, slopes, embankments, conveyances, etc.) and protect these soils from erosion by rain, wind or storm water run-on and run-off. SCE shall consider the use of plastic materials that are resistant to solar degradation.

3.5 Sediment Controls

Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This Project will incorporate at a minimum, temporary sediment control measures, and other measures selected by SCE.

Implementation and locations of temporary sediment control BMPs are shown on the Site Map in Appendix B. The BMPs that will be implemented to control sediment for the Project are detailed below.

3.5.1 Linear Barriers/Perimeter Controls

Linear barriers for perimeter protection will be applied throughout the Project. The installation of linear barriers will serve as sediment control for exposed soil areas. Linear barriers shall be maintained to provide adequate sediment holding capacity. Linear barriers will be placed across construction phase perimeters. These linear barriers will be placed to prevent sheet flow from running uninterrupted into areas of the Project under active construction. As construction progresses and these Linear Barrier/Perimeter Control BMPs are implemented, altered, removed, and/or no longer required, the Site Map in Appendix B shall be updated.

The following BMPs have been selected to control sediment from discharging from the perimeter of active construction areas, ingress and egress locations, and into natural drainage systems outside of the construction area:

- **SE-1 – Silt Fence**

  Due to high winds commonly experienced in the Project area, use of silt fence may not be suitable in most areas. If it is determined to be necessary, proper installation for this BMP is crucial to withstand wind forces that it may encounter. These barriers may be placed according to SE-1 to prevent sheet flow from running uninterrupted into the Project construction area. Sediment shall be removed when it reaches approximately 1/3 of the barrier height. Barriers shall be removed from the site when no longer required. .

- **SE-5 – Fiber Rolls**

Fiber rolls may be placed around the Project perimeter, down-slope of exposed soil areas, and around temporary stockpiles. SCE shall place fiber rolls, as designated on the Site Map, in locations to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from runoff.

Fiber roll barriers shall be secured (staked) to the ground in a trench depth of 1/4 to 1/3 of the thickness of the roll, and a width of the diameter of the roll. The area behind the fiber rolls will collect and hold runoff in order to allow suspended sediment to settle out. SCE will remove this sediment periodically, and especially after heavy rains. Fiber rolls, which become clogged with sediment, will be replaced as necessary to ensure the free flow of water.

- **SE-6 – Gravel Bag Berm**

  Gravel bag berms may be placed temporary stockpiles or the site perimeter. These barriers will be used to prevent sheet flow from running uninterrupted into existing drainage systems and to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from runoff.

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- **TC-1 – Stabilized Construction Entrance/Exit**

  A stabilized construction entrances/exits shall be constructed per CASQA and maintained at the northern entrance gate to the Project (Nipton Road entrance) as shown on the Site Map(s) in Appendix B.

  Construction entrances/exits will be stabilized to reduce tracking of sediment as a result of construction traffic. The designated entrances/exits will be graded to prevent runoff from leaving the construction areas. Stabilization material will be 3 to 6-inch aggregate. The entrances will be flared where it meets the existing road to provide an adequate turning radius. SCE shall limit speed of vehicles to control dust.

- **SE-7 – Sediment Sweeping and Vacuuming**

  SCE will implement sweeping and vacuuming, as necessary to control sediment that is tracked from the Project construction areas onto public roads. This will limit the amount of sediment that may be transported to storm drains or watercourses. Areas requiring implementation of the BMP shall be as shown on the Site Map in Appendix B.

3.5.2 Run-on – Run-off Controls

The following BMP has been selected to control sediment discharge from any potential run-on and runoff flows entering or leaving the construction site:

- **SE-6 – Gravel Bag Berm**

  This barrier may be used in conjunction with SE-5 (fiber rolls) to prevent run-on, run-off from running uninterrupted into the construction area to reduce flow velocities and release the runoff as sheet flow, providing removal of sediment from runoff.

3.6 Post-Construction Stormwater Management Measures

This Project is located in San Bernardino County and is not subject to standards of an active Phase I or Phase II Municipal Separate Storm Sewer System (MS4) Permit. This Project would be subject to any

runoff reduction requirements of the CGP. However, these requirements do not take effect until September 2, 2012 and, therefore, are not required to be implemented for this Project.

SECTION 4
BMP INSPECTION AND MAINTENANCE

4.1 BMP Inspection and Maintenance

All inspection, maintenance, repair, and sampling activities shall be performed or supervised by a Qualified SWPPP Practitioner (QSP). Refer to Section 6.1.2 for QSP contact information. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment. Site personnel who have received training on SWPPP implementation, BMP inspection and maintenance, and record keeping will be documented on a training log maintained in Appendix I.

4.1.1 Visual Inspections

Inspections for this Project shall be performed as follows:

- Weekly (Baseline)
- Quarterly
- Rain Inspections:
    - Pre-Rain Event
    - During (24-Hour) Rain Event
    - Post-Rain Event
- Stored or Contained Storm Water Discharge

The purpose of these inspections is to determine if implemented BMPs need maintenance, have failed, or could fail to operate as intended. If deficiencies are identified during BMP inspections, repairs or design changes shall be initiated within 72 hours of identification.

All Inspections shall be documented on the Site Inspection Checklist, provided in Appendix J, and shall remain onsite with the SWPPP at all times.

4.1.2 Qualifying Rain Event Inspections

The QSP shall visually inspect the construction site within two days prior to a predicted qualifying rain event, and within two days after a qualifying rain event. These inspections are only required within normal business hours of the construction site.

According to the General Permit, a qualifying rain event produces ½ inch or more of precipitation within a 48 hour or greater period between events. Weather forecast information shall be obtained from only the National Oceanographic Atmospheric Administration (NOAA) at the following website: http://www.srh.noaa.gov/.

The QSP will record the storm information for all qualifying rain events including the date, place, time of facility inspections, sampling, visual observation (inspections) notes, and/or measurements, including precipitation. Inspections shall be documented on the Visual Inspection Field Log, provided in Appendix J, and shall remain on-site with the SWPPP at all times.

4.1.3 Stored or Contained Storm Water Monitoring Locations

The QSP shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours. Inspections will be documented using the Visual Inspection Field Log, provided in Appendix J, and maintained onsite with the SWPPP.

4.1.4 Quarterly Non-Stormwater Discharge Inspections

Non-stormwater discharge inspections will be conducted at each drainage area per quarter at the construction site during normal daylight business hours within the following periods:

- January – March,
- April – June,
- July – September, and
- October – December.

Quarterly inspections will be documented using the Visual Inspection Field Log, provided in Appendix J, and maintained on-site with the SWPPP.

4.1.5 Maintenance and Repair

The QSP and/or delegated personnel shall begin implementing repairs or design changes to BMPs within 72 hours of identification of BMPs that:

- Need maintenance to operate effectively;
- Have failed; or
- Could fail to operate as intended.

If the problem warrants an amendment (e.g. a new procedure or BMP that needs to be implemented), the QSP, or designated personnel shall notify the QSD.

SECTION 5
TRAINING

5.1 Training

Personnel at the site shall receive training appropriate for individual roles and responsibilities on the Project. Appropriate personnel shall receive training on SWPPP implementation, BMP inspection and maintenance, and record keeping.

The training log showing formal and informal training of various personnel is provided in Appendix I. This form shall be used by the SCE QSP to document informal training of onsite personnel, including subcontractor's supervisors, project foremen, laborers, or other staff members.

SECTION 6
RESPONSIBLE PARTIES AND OPERATORS

6.1 Responsible Parties

The following sections provide a description of authorized representatives that have been approved by the LRP to be responsible for SWPPP activities and have been granted authority to sign permit related documents. Refer to Appendix G – Responsible Parties, for a copy of written authorizations.

6.1.1 Qualified SWPPP Developer (QSD)

The SWPPP shall be written, amended, and certified by a Qualified SWPPP Developer. The QSD shall meet the qualifications as specified by section VII.B.1 of the General Permit. Refer to Appendix A for the General Permit.

The Qualified SWPPP Developer that prepared this SWPPP was:

Alan Batdorf
CPESC No. 5823, QSD CASQA Registration No. 221
Senior Scientist
AEI-CASC Consulting
(949) 453-1783

6.1.2 Qualified SWPPP Practitioner (QSP)

The General Permit requires that the personnel assigned to conduct inspections and monitoring is knowledgeable in the principles and practice of erosion and sediment controls. Assigned personnel shall possess the skills to assess the effectiveness of measures selected to control the quality of storm water discharges from the construction activity.

The Qualified SWPPP Practitioner assigned to the Project is:

John Slayton
CHMM REM CPEA
CPESC No. 5955., QSD/P CASQA Registration No. 229
SCE TDBU SWPPP Coordinator
Southern California Edison
(310) 990-1745

The QSP is responsible for non-storm water and storm water visual observations, sampling and analysis, and responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges. The QSP will be available at all times throughout the duration of the Project. Duties of QSP include but are not limited to:

- Ensuring full compliance with the SWPPP and the Permit
- Implementing all elements of the SWPPP, including but not limited to:
    - Implementation of prompt and effective erosion and sediment control measures
    - Implementing all non-storm water management, and materials and waste management activities such as monitoring discharges (dewatering, diversion devices)

  - General site clean-up
  - Vehicle and equipment cleaning, fueling and maintenance
  - Spill control
  - Ensuring that no materials other than storm water are discharged in quantities that will have an adverse effect on receiving waters or storm drain systems, etc.
- Weekly inspections
- Pre-storm inspections
- Post-storm inspections
- Storm event inspections
- Quarterly inspections
- Retaining documentation necessary for the preparation of the annual report
- Ensuring elimination of all unauthorized discharges
- The QSP shall be assigned authority by the SCE Project Manager to mobilize crews in order to make immediate repairs to the control measures
- Coordinate with the SCE Project Manager to assure all of the necessary corrections/repairs are made immediately, and that the Project complies with the SWPPP, the Permit and approved plans at all times
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges

6.2 Contractors List

All Contractors and Subcontractors will be notified of the requirement for storm water management measures during the Project. A list of contractors, subcontractors, and other individuals directed by the QSP will be maintained and included in Appendix H of this SWPPP. If Subcontractors change during the Project, the list will be updated accordingly.

SECTION 7
CONSTRUCTION SITE MONITORING PROGRAM (CSMP)

This CSMP is a guide for the QSP, and/or qualified individual(s) supervised by the QSP, for monitoring and sampling procedures and instructions. The QSP is to determine whether BMPs included in the SWPPP are effective, if immediate actions are needed and/or SWPPP revisions are necessary to reduce pollutants in storm water and authorized non-storm water discharges.

7.1 Objectives

SCE has prepared this CSMP prior to the start of the construction project, so that it shall be implemented immediately upon the start of construction. The CSMP shall be implemented at the appropriate level to protect water quality at all times throughout the life of the project. This CSMP addresses the following objectives:

- Demonstrate that the site is in compliance with the Discharge Prohibitions;
- Determine whether non-visible pollutants are present at the site and are causing or contributing to exceedances of water quality objectives;
- Determine whether immediate corrective actions, additional BMP implementations, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges; and
- Determine whether BMPs are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges.

7.2 Implementation Schedule

SCE has prepared this CSMP prior to the start of the construction project, so that it shall be implemented immediately upon the start of construction. The CSMP shall be implemented at the appropriate level to protect water quality at all times throughout the life of the project.

The CSMP shall be revised when:

- Site conditions or construction activities change such that a change in monitoring is required to comply with the requirements and intent of this General Permit; or
- The Regional Water Board requires SCE to revise its CSMP based on its review of the document. Revisions may include, but not limited to, conducting additional site inspections, submitting reports, and certifications. Revisions shall be submitted via postal mail or electronic e-mail.

7.3 Monitoring and Reporting Requirements

Table 7-1
Summary of Monitoring Requirements for Risk Level 1

Risk Level	Visual Inspections						Sample Collection		
	Weekly BMP	Quarterly Non-Stormwater Discharge	Pre-Storm Event		Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water	Non-Visible (when applicable)
			Baseline	REAP					
1	X	X	X	NA	X	X	NA	NA	X

	Type of Monitoring	When
Sampling & Analysis	Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff that is unaffected by the spilled or released material(s).
	Other	RWQCB or TMDLs may require other monitoring.
Visual Inspections	Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and stormwater containments within two business days prior to each qualifying rain event.
	Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained storm water when discharged.
	During rain inspection	See BMP inspection below
	BMP	Weekly and every 24 hours during extended storm events.
	Non-stormwater discharge inspection	Once per quarter (Jan-Mar, Apr-Jun, July-Sept, Oct-Dec)

NA = Not Applicable

7.3.1 Inspection Requirements

SCE is subject to the following inspection requirements:

- SCE shall ensure that all inspections are conducted by trained personnel. The name(s) and contact number(s) of the assigned inspection personnel are listed in this SWPPP.
- SCE shall ensure that all visual inspections are conducted weekly during working hours and in conjunction with other activities in areas where active construction is occurring.
- SCE shall ensure that during storm inspections are conducted at least once each 24-hour period, during extended storm events and are documented (Site Inspection Checklist in Appendix J).
- SCE shall ensure that pre-storm and post-storm inspections are conducted for each qualifying event and documented (Site Inspection Checklist in Appendix J).

- SCE shall conduct quarterly non-stormwater discharge inspections to document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source, and document the response taken to control or eliminate unauthorized non-storm water discharges.
- Inspections may be discontinued in non-active construction areas where soil-disturbing activities are completed and final soil stabilization is achieved (e.g., paving is completed, substructures are installed, vegetation meets minimum cover requirements for final stabilization, or other stabilization requirements are met).
- Inspection programs are required where temporary and permanent stabilization BMPs are installed and are to be monitored after active construction is completed. Inspection activities shall continue until adequate permanent stabilization is established and, in areas where re-vegetation is chosen, until minimum vegetative coverage is established per final stabilization criteria.

7.3.2 Inspection Exceptions

SCE is not required to conduct inspections under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled construction hours (e.g., typical hours 0630 – 1530).

SCE will document why the inspections were not conducted and include these exceptions into the SWPPP and the Annual Report.

7.4 Non-Visible Pollutant Monitoring Requirements

All projects, regardless of risk level, are required to monitor runoff for non-visible pollutants in the event of a BMP failure, breach, or spill. An area unaffected by the failure, breach, or spill must also be sampled to serve as the basis of comparison.

7.5 Sample Analysis Plan for Non-Visible Pollutant Monitoring

SCE is subject to the following non-visible pollutant monitoring requirements:

- SCE shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would be visually detectable in storm water;
- SCE is not required to sample if one of the conditions described above (e.g., breach or spill) occurs and the site is cleaned of material and pollutants and/or BMPs are implemented prior to the next storm event;
- SCE shall ensure that water samples are large enough to characterize the site conditions;
- SCE shall collect samples at all discharge locations that can be safely accessed;
- SCE shall collect samples during the first two hours of discharge from rain events that occur during business hours which generate runoff;
- SCE shall analyze samples for the non-visible pollutant parameters, if applicable (see the list of parameters identified in Table 2-5 – Potential Construction Site Pollutants);

- SCE shall collect a sample of storm water that has not come in contact with the disturbed soil or materials stored or used onsite (uncontaminated sample) for comparison with the discharge sample;
- SCE shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis;
- For laboratory analyses, all sampling sample preservation, and other analyses must be conducted according to test procedures pursuant to 40 C.F.R. Part 136. SCE shall ensure that field samples are collected and analyzed according to manufacturer specifications of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specifications; and
- SCE shall keep all field/or analytical data in the SWPPP document.

7.6 Non-Visible Pollutant Sampling Locations

Locations for the collection of non-visible pollutant sampling are described below.

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use; accessibility for sampling, personnel safety; and other factors in accordance with the applicable requirements in the General Permit. Planned sampling locations are dependent on the current construction activities occurring in the construction areas and locations shall be determined by the QSP and shall be shown on the Site Map prior to sampling. Labeling shall be identified as indicated below.

- Based on the QSP's routine monitoring inspections, sampling will be conducted when it is evident that a breach, malfunction, or spill has occurred. The sampling location(s) will be field located down gradient of the areas that have come into contact with the pollutant material.
    - The down gradient sample location(s), will be designated as D1, D2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Map at the time the location is identified.
- Up gradient sampling locations will be identified for the collection of an uncontaminated runoff sample (background sample) for comparison with the down gradient samples. The up gradient samples will be analyzed for the same non-visible pollutants as the down gradient samples. The location(s) will be selected so that the runoff sample will not have come in contact with the pollutant material.
    - The up gradient sample location(s), will be designated as U1, U2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Map at the time the location is identified.
- Since there are no known areas of historical contamination at this site, there are no designated sampling locations. If areas of contamination are subsequently discovered during construction activities, the SWPPP will be amended by the QSD.

7.7 Safety

Care must be exercised in selecting representative sampling locations and in sample collection to ensure the safety of the sampling crew(s). Avoid entering a water body for sampling if possible. Potential hazards may include but are not limited to the following in Table 7-2.

Table 7-2
Potential Safety Hazards

Hazard	Safety Precautions
Animals and Plants	Be alert for the presence of snakes, rodents, insects, and poisonous plants and avoid contact. Long pants are recommended for all field crews.
Construction Operations	Follow construction site safety protocols. Be aware of trip and slip hazards and confirm activities before entering constructions zones. Obey all caution and danger signage.
Lifting heavy objects	Use proper lifting techniques.
Rough terrain	Wear boots with non-slip soles. Use appropriate caution when walking in rough terrain. Two person-sampling crews are recommended when working from or descending steep banks where the water is greater than knee deep.
Weather	Observe weather conditions, avoid lightning strike prone features, wear appropriate clothing, and be aware of flash flood dangers.
Reagents, preservatives	Wear appropriate personal protective equipment (PPE) when using reagents or preservatives.

7.8 Sampling Schedule

Samples for the applicable non-visible pollutant(s) will be collected from the discharge along with a sufficiently large uncontaminated background sample. Samples shall be collected during the first two hours of discharge from rain events, during business hours, and which generate runoff.

7.8.1 Sampling Personnel

Samples on the Project site will be collected by the following AEI-CASC sampling personnel:

Name/Telephone Number: Matt Renaud, CPESC (818) 263-3566

Name/Telephone Number: Michael O'Hearn, CESSWI (714) 497-7276

Alternate(s)/Telephone Number: _____

Alternate(s)/Telephone Number: _____

All sampling personnel and alternates will review the CSMP, described herein for the qualifications of designated contractor personnel describing environmental sampling training and experience as provided in Appendix I.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the Project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come in contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule described above.

Supplies maintained at the Project site will include, but are not limited to, surgical gloves, sample collection equipment (bailers, etc.), coolers, appropriate number and volume of sample bottles, identification labels, resealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms.

AEI-CASC will obtain and maintain the field-testing instruments, as described under Sample Analysis, for analyzing samples in the field by contractor sampling personnel.

Safety practices for sample collection will be in accordance with AEI-CASC Consulting's ***Health and Safety Plan, August 2007***.

7.8.2 Analytical Constituents

Table 7-3 lists the sources of and types of potential non-visible pollutants on the Project and the applicable water quality indicator parameter(s) for that pollutant. Refer to Appendix J for The Construction Material and Pollutant Testing Guidance Table - Non-Visible Pollutants, which contains a partial list of additional common sources of non-visible pollutants.

Table 7-3
Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Vehicle batteries	Sulfate or pH	Sulfuric acid or pH
Cleaning products	Acids/ Bleaches/ Solvents	pH/ chlorine/ VOC, SVOC
Masonry products	pH, Alkalinity	pH, Alkalinity
Adhesives	Adhesives	COD/ Phenols/ SVOC
Vehicle	Batteries	Sulfuric Acid, Lead, pH
Treated wood products	ACZA, CCA, ACA, Copper Naphthenate	Arsenic, Chromium (Total), Copper, and Zinc

7.8.3 Sample Collection Procedures

Samples of discharge will be collected at the designated sampling locations described in 7.6 and as shown on the Site Map(s) in Appendix B for locations of observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples will be collected and preserved in accordance with the methods identified in Table 7-5. Only personnel trained in proper water quality sampling will collect samples.

Samples will be collected by following the steps outlined below:

1. Place a laboratory provided sampling container directly into a stream of water downgradient and within close proximity to the potential non-visible pollutant discharge location;
2. Transfer the collected sample into the sample bottles (supplied by the lab for the appropriate parameters being monitored) filling the bottles completely (or as instructed by the laboratory);
3. The upgradient (uncontaminated) background samples will be collected first, prior to collecting the downgradient sample, in order to minimize cross-contamination; and
4. Sampling personnel will collect the water upgradient of where they are standing.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of powder-free nitrile gloves prior to the collection and handling of each sample at each location;
- Not contaminate the inside of the sample bottle by allowing it to come into contact with any material other than the water sample;
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection;
- Not leave the cooler lid open for an extended period of time once samples are placed inside;
- Not sample near a running vehicle where exhaust fumes may impact the sample;
- Not touch the exposed end of a sampling tube, if applicable;
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles;
- Not eat, smoke, or drink during sample collection nor sneeze or cough in the direction of an open sample bottle;
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample;
- Decontaminate sampling equipment prior to sample collection using a tri-sodium phosphate (TSP) solution water wash and triple rinse with distilled or de-ionized water; and
- Dispose of decontamination water/soaps appropriately (i.e., do not discharge to the storm drain system or receiving water).

7.8.4 Sample Documentation

Sample documentation consists of appropriate information onto sample bottle identification labels, Chain-of-Custody forms, Sampling Activity Logs, and Inspection Checklists. It is important that waterproof labels, paper, and ink are used. These will be considered recordable documents. If an error is made on a document, the individual shall make corrections by lining through the error, initial and date, and entering the correct information. Copies of the Sampling Activity Log will be maintained in Appendix J.

Sampling and field analysis activity will be documented using the following forms:

- Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:
  - Project name
  - Project number
  - Unique sample identification number and location. (Example: Nipton-D1-102211 which would denote Project Name [Name], Sample Site [D1], Sample Date [mmddyy])
  - Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation (Example: Nipton-D1-102211-DUP1).
  - Collection date/time
  - Analysis constituent
- Sampling Activity Logs: A log of sampling events will identify:
  - Sampling date

- Separate times for collected samples and QA/QC samples recorded to the nearest minute (am/pm)
- Unique sample identification number and location
- Analysis constituent
- Names of sampling personnel
- Weather conditions (including precipitation amount)
- Field analysis results
- Other pertinent data

- Chain-of-Custody (COC) forms: All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Proper transferring of responsibility must be recorded on the COC signature fields, the final signature will be of the receiving lab personnel. COC procedures will be strictly adhered to for QA/QC purposes.
- Storm Water Quality Construction Inspection Checklists: When applicable, the contractor's storm water inspector will document on the checklist that samples for non-visible pollutants were taken during a rain event.

7.8.5 Laboratory Analysis

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a Chain-of-Custody form provided by the analytical laboratory, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to the following California state-certified laboratory:

Laboratory Name: Calscience Environmental Laboratories, Inc.

Address: 7440 Lincoln Way

Garden Grove, CA

Telephone Number: 714-895-5494

Point of Contact:

7.8.6 Sample Analysis

Samples will be analyzed for the applicable constituents using the analytical methods identified in Table 7-5 (Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants).

Laboratory Analysis: For samples that will be analyzed by a laboratory, sampling, preservation and analysis shall be performed by a state-certified laboratory in accordance with 40 CFR Part 136.

Field Analysis: For samples collected for field analysis, the collection, analysis, and equipment calibration will be in accordance with field instrument manufacturer's specifications. Table 7-4 lists the type of instruments used in the field for particular parameters.

Table 7-4
Field Analysis Instrumentation

Field Instrument	Constituent
pH Meter	pH
Turbidity Meter	Turbidity

- The instruments will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling event.
- Maintenance and calibration records will be maintained with the SWPPP.

Table 7-5
Sample Collection, Preservation and Analysis for Non-Visible Pollutants
EXAMPLE TABLE (call laboratory for specifications)

Parameter	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3 x 40 mL	VOA-glass	Store at 4° C, HCl to pH<2	1 ug/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass-amber	Store at 4° C	10 ug/L	7 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-amber	Store at 4° C	0.1□ug/L	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-amber	Store at 4° C	Check Lab	7 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4° C	1 mg/L	48 hours
COD	EPA 410.4	1 x 250 mL	Glass-Amber	Store at 4° C, H2SO4 to pH<2	5 mg/L	28 days
DO	SM 4500-O G	1 x 250 mL	Glass-Amber	Store at 4° C	Check Lab	8 hours
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	unitless	Immediate
Alkalinity	SM 2320B	1 x 250 mL	Polypropylene	Store at 4° C	1 mg/L	14 days
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4° C, HNO3 to pH<2	0.1 mg/L	6 months
Metals (Chromium VI)	EPA 7199	1 x 500 mL	Polypropylene	Store at 4° C	01□ug/L	24 hours

- **Notes:**

°C	–	Degrees Celsius	ug/L	–	Micrograms per Liter
BOD	–	Biological Oxygen Demand	ml	–	Milliliter
COD	–	Chemical Oxygen Demand	PCB	–	Polychlorinated Biphenyl
DO	–	Dissolved Oxygen	SVOC	–	Semi-Volatile Organic Compound
EPA	–	Environmental Protection Agency	SM	–	Standard Method
HCl	–	Hydrogen Chloride	TPH	–	Total Petroleum Hydrocarbons
H2SO4	–	Hydrogen Sulfide	TRPH	–	Total Recoverable Petroleum Hydrocarbons
HNO3	–	Nitric Acid	VOA	–	Volatile Organic Analysis
L	–	Liter	VOC	–	Volatile Organic Compound
mg/L	–	Milligrams per Liter			

7.9 Quality Assurance and Quality Control

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or 1 duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicates will be collected where contamination is likely, not on the background sample. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

7.10 Retention of Records

All records, storm water monitoring information, lab data, and reports, including the Annual Report and supportive documentation, shall be retained for a period of at least three years. These records shall include:

A. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

B. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

C. The date and approximate time of analyses.

D. The individual(s) who performed the analyses.

E. A summary of all analytical results from the last three years, the method detection limits and reporting units, and the analytical techniques or methods used.

F. Rain gauge readings from site inspections.

G. Quality assurance/quality control records and results.

H. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records .

I. Visual observation and sample collection exception records.

J. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

APPENDIX A

CONSTRUCTION GENERAL PERMIT

ORDER NO. 2009-0009-DWQ AND AMENDMENT ORDER NO. 2010-0014-DWQ

The complete document can be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_complete.pdf

Will be placed in field SWPPP

APPENDIX B

SUBMITTED PERMIT REGISTRATION DOCUMENTS

1. Notice of Intent (NOI) – To be included in field SWPPP
2. Risk Assessments Worksheets
3. Site Plans (Vicinity Map, Erosion Control Plans)
4. WDID Confirmation Letter – To be included in field SWPPP
5. Signed Certification Statements – To be included in field SWPPP

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SCE:

NIPTON MATERIAL STORAGE YARD

NOTICE OF INTENT (NOI)

State Water Resources Control Board

NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY
(WQ ORDER No. 2009-0009-DWQ)

WDID: **Risk Level:** Level1

Property Owner Information

Type: Special District

Name: Southern California Edison
Address: 8631 Rush Street
Address 2:
City/State/Zip: Rosemead CA 91770

Contact Name:
Title:
Phone #: 310-990-1745
Email: john.slayton@sce.com

Contractor/Developer Information

Name: Southern California Edison
Address: 8631 Rush Street
Address 2:
City/State/Zip: Rosemead CA 91770

Contact Name: John Slayton
Title:
Phone #: 310-990-1745
Email: john.slayton@sce.com

Construction Site Information

Site Name: Nipton Material Storage Yard
Address: Nipton Road
City/State/Zip: Nipton CA 92364
County: San Bernardino
Latitude: 35.46546 Longitude: -115.273974
Total Size of Construction Area: 40
Total Area to be Disturbed: 10

Contact Name: John Slayton
Title:
Site Phone #: 310-990-1745
Email: john.slayton@sce.com
Construction Start: September 01, 2011
Complete Grading:
Final Stabilization: August 31, 2012

Risk Values

R: 10 K: 0.17 LS: 3.66 Beneficial Uses/303(d): No

Type of Construction: *Utility: null*Other: EITP Material Storage Yard
Receiving Water: Ivanpah Lake
Qualified SWPPP Developer: Alan Batdorf
RWQCB Jurisdiction: Region 6B - Victorville
Phone: 760-241-6583

Certification #:
Email: r6b_stormwater@waterboards.ca.gov

Certification

Name
Title:

Date:

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: EITP - Nipton Yard
Start Date: 09/01/2011
End Date: 08/31/2012
Latitude: 35.4655
Longitutde: -115.2740

Erosivity Index Calculator Results

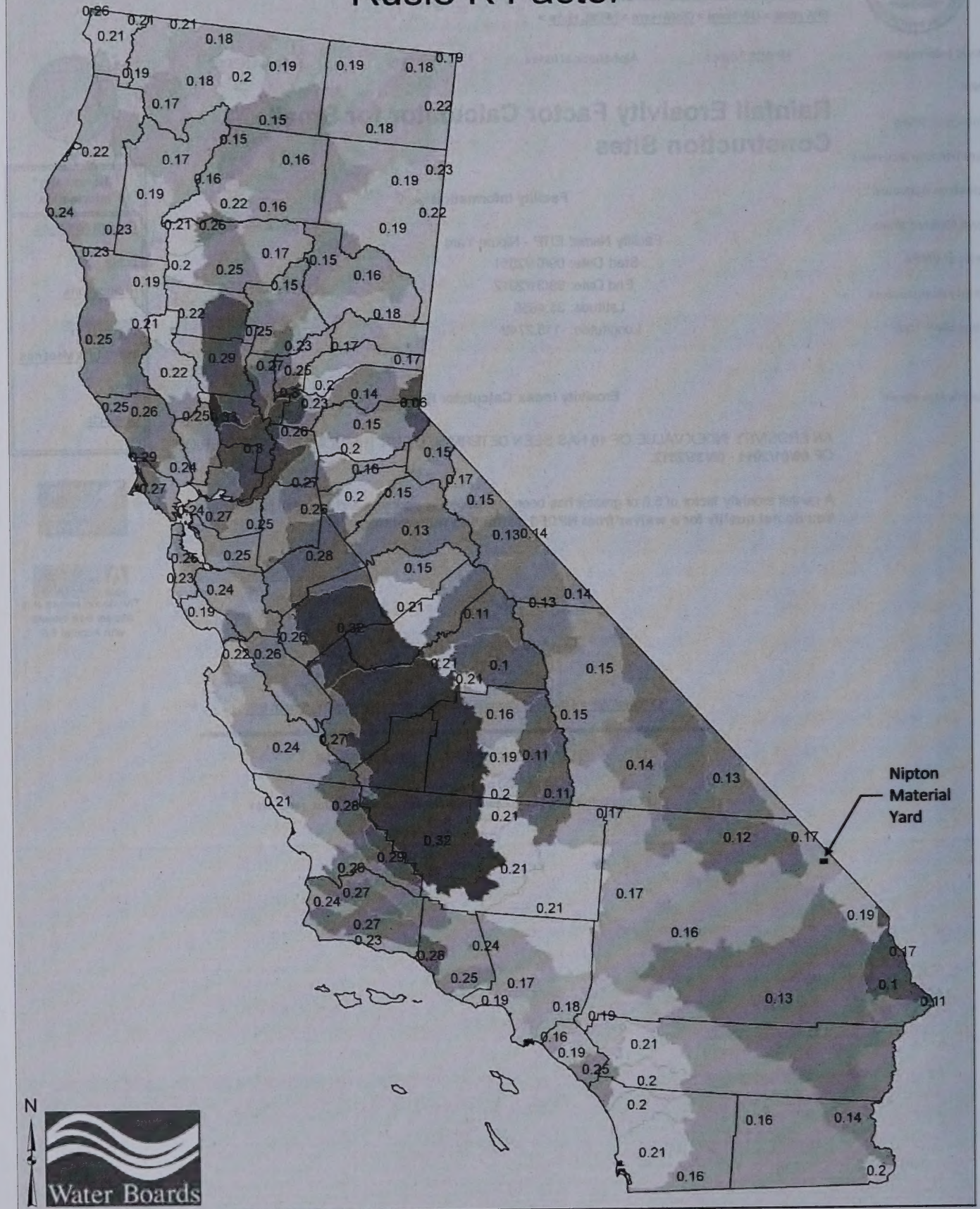
AN EROSIVITY INDEX VALUE OF **10** HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **09/01/2011 - 08/31/2012**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do not qualify for a waiver from NPDES permitting requirements**.

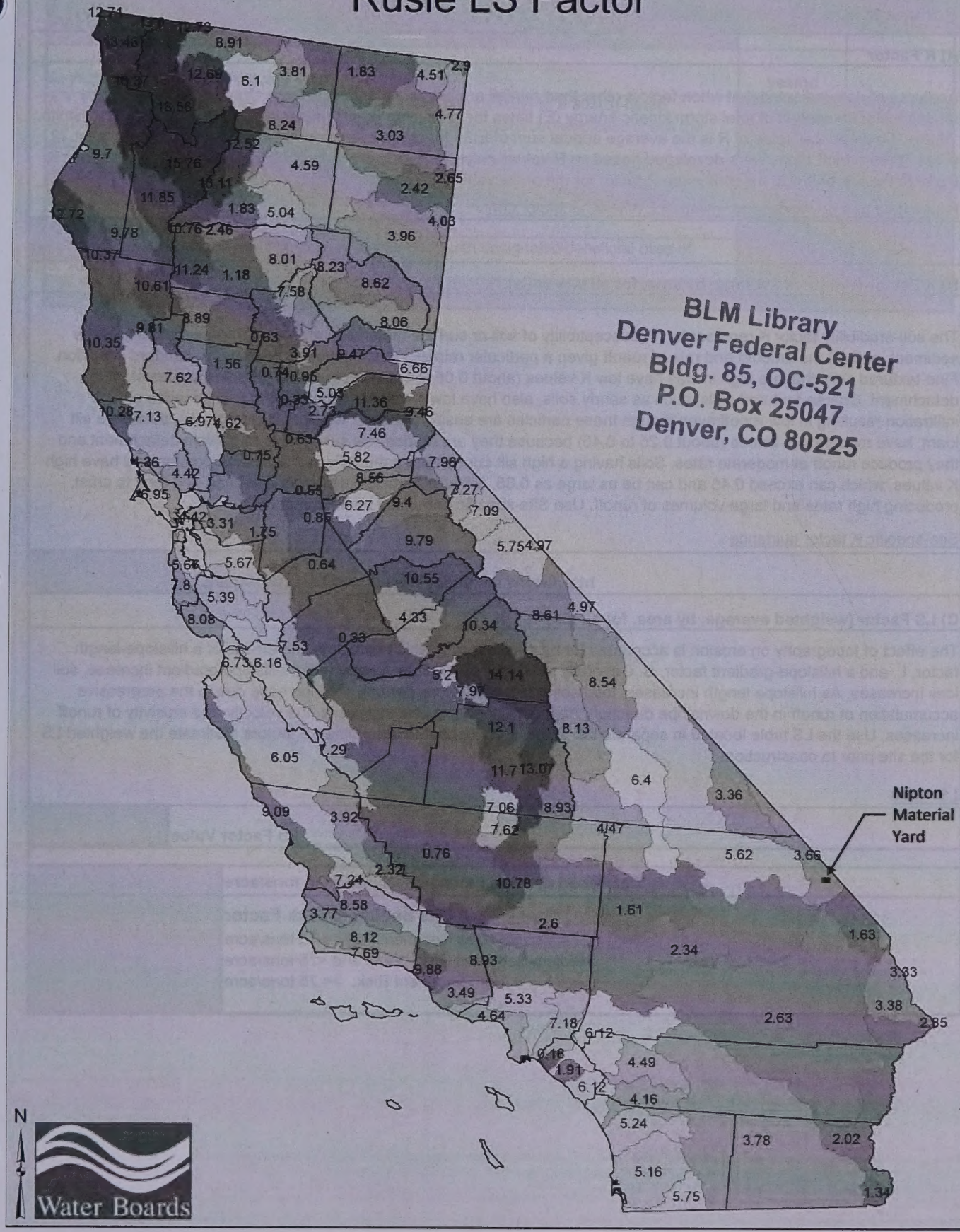
Start Over

Get Acrobat Reader
The documents on this site are best viewed with Acrobat 8.0

Rusle K Factor



Rusle LS Factor



Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site. http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	10
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted. Site-specific K factor guidance	
http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	0.17
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction. LS Table	
LS Factor Value	3.66
Watershed Erosion Estimate (=RxKxLS) in tons/acre	6.22
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below:	**No**	**Low**
2006 Approved Sediment-impared WBs Worksheet		
http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml		
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY?		
http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp		

Combined Risk Level Matrix

Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	
High	Level 2		Level 3

Project Sediment Risk: Low

Project RW Risk: Low

Project Combined Risk: Level 1

SCE:

NIPTON MATERIAL STORAGE YARD

RISK ASSESSMENT

SCE:

NIPTON MATERIAL STORAGE YARD

SITE PLANS (VICINITY MAP, SITE MAP)

SCE:

Nipton Material Storage Yard

Site Plans (Vicinity Map, Site Map)

VICINITY MAP
FOR
NIPTON MATERIAL STORAGE YARD
NIPTON, SAN BERNARDINO COUNTY

N

N.T.S.

VICINITY MAP

FOR

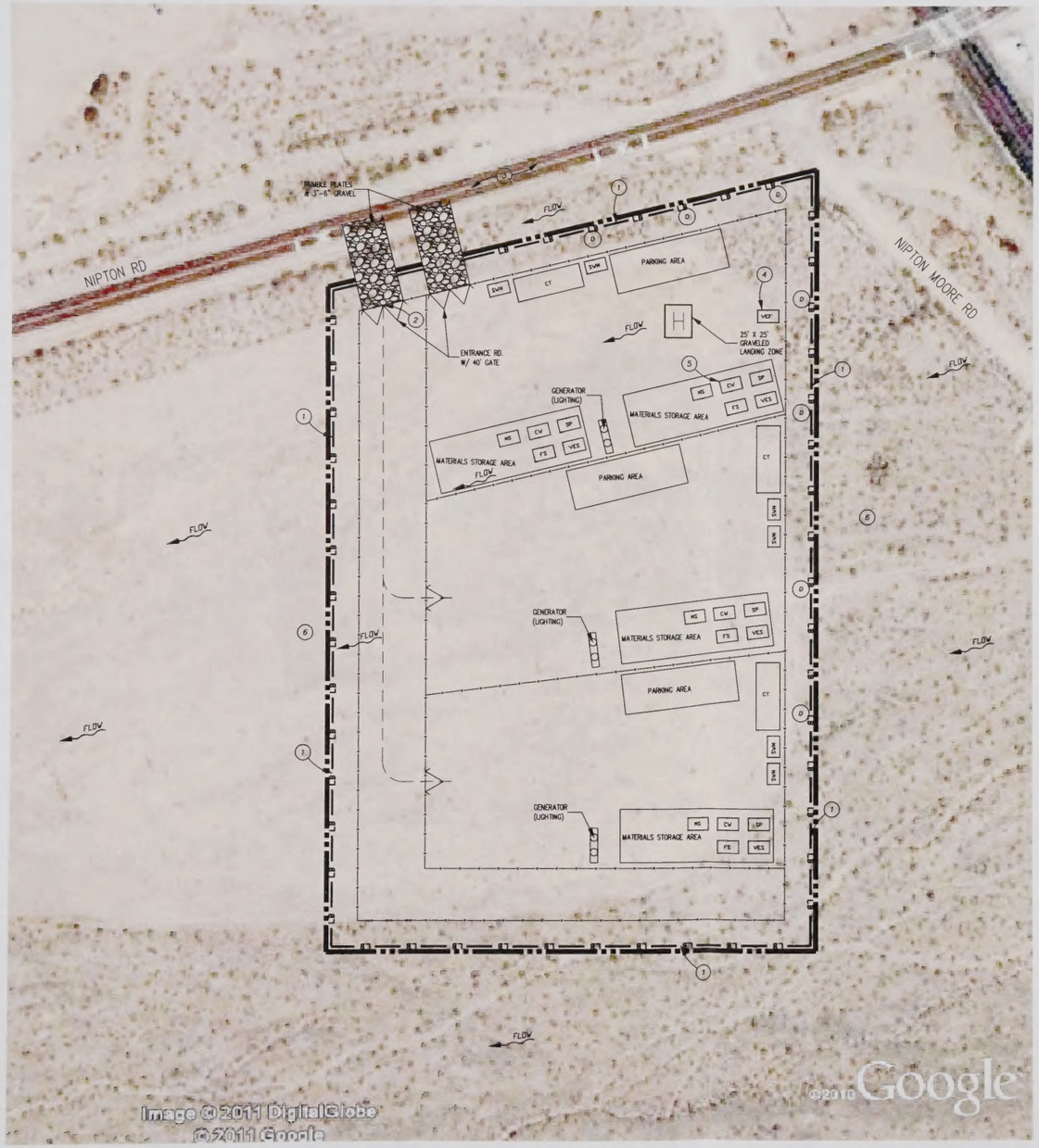
NIPTON MATERIAL STORAGE YARD

NIPTON, SAN BERNARDINO COUNTY

N

NTS

SITE MAP
FOR
NIPTON MATERIAL STORAGE YARD
ADJACENT TO NIPTON ROAD
NIPTON, CA 92364



WATER POLLUTION CONTROL NOTES

1. INSTALL LINEAR BARRIER (SILT FENCE, FIBER ROLL OR GRAVEL BAG) PER CASQA BMP SE-1, SE-5, SE-6. THE CONTRACTOR SHALL DOCUMENT AND UPDATE SITE MAP PER FIELD CONDITIONS.
2. INSTALL STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA BMP TC-1.
3. IMPLEMENT STREET SWEEPING AND VACUUMING PER CASQA BMP SE-7.
4. IMPLEMENT VEHICLE AND EQUIPMENT FUELING PER CASQA BMP NS-9.
5. IMPLEMENT VEHICLE AND EQUIPMENT STORAGE AND FUELING; MATERIALS STORAGE, STOCKPILE MANAGEMENT, CONCRETE WASTE MANAGEMENT, AND SANITARY WASTE MANAGEMENT IN THE STAGING AREA PER CASQA BMPS NS-9, NS-10, WM-1, WM-3, WM-8, AND WM-9.
6. UPSTREAM AND DOWNSTREAM SAMPLING LOCATIONS TO BE FIELD LOCATED.

LEGEND

MS	MATERIAL STORAGE		PROJECT BOUNDARY
CV	CONCRETE WASHOUT	LB	LINEAR BARRIER (SE-1, SE-5, or SE-6)
FS	FUEL STORAGE		PROPOSED VEHICLE ACCESS
SWM	SANITARY WASTE MANAGEMENT		PROPOSED 6' CHAINLINK FENCE W/ SCREENING
SP	STOCKPILE MANAGEMENT		STABILIZED CONSTRUCTION ENTRANCE/EXIT
VES	VEHICLE AND EQUIPMENT STORAGE	FLOW	FLOW DIRECTION
VEF	VEHICLE AND EQUIPMENT FUELING	D	DISTRIBUTION FEED
CT	CONSTRUCTION TRAILER		

APPROX. 10 ACRES DISTURBED AREA

GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE CONTRACTOR AND SUBCONTRACTORS TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.
3. SECTION 3 OF THE SWPPP DESCRIBES THE BEST MANAGEMENT PRACTICES TO BE USED ON THIS SITE.
4. IMPLEMENTATION OF THE VARIOUS WATER POLLUTION CONTROL MEASURES WILL CONFORM TO THE REQUIRED CONSTRUCTION STAGING REQUIREMENTS.

N.T.S.

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: NIPTON MATERIAL STORAGE YARD

STORM WATER POLLUTION PREVENTION PLAN
SITE MAP

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO.
SITE MAP-01

SCALE: N.T.S.
1 OF 1 SHTS.

SCE:

NIPTON MATERIAL STORAGE YARD

WDID CONFIRMATION LETTER

SCE:

NIPTON MATERIAL STORAGE YARD

SIGNED CERTIFICATION STATEMENTS

APPENDIX C

AMENDMENT LOG

SWPPP AMENDMENT LOG

Project Name: Nipton Material Storage Yard

Amendment No.	Prepared by QSD	Brief Description of Amendment	Date

APPENDIX D

CONSTRUCTION SCHEDULE

Construction Schedule

Estimated Dates	Event or Construction Phase
9/1/11	Estimated Project Start
12/21/11	Estimated Yard Ready to Receive Materials
8/31/12	Estimated Project Completion

Construction Schedule

9/1/23	Estimated Project Start
12/23/23	Estimated Yard Ready to Receive Materials
8/23/23	Estimated Project Completion

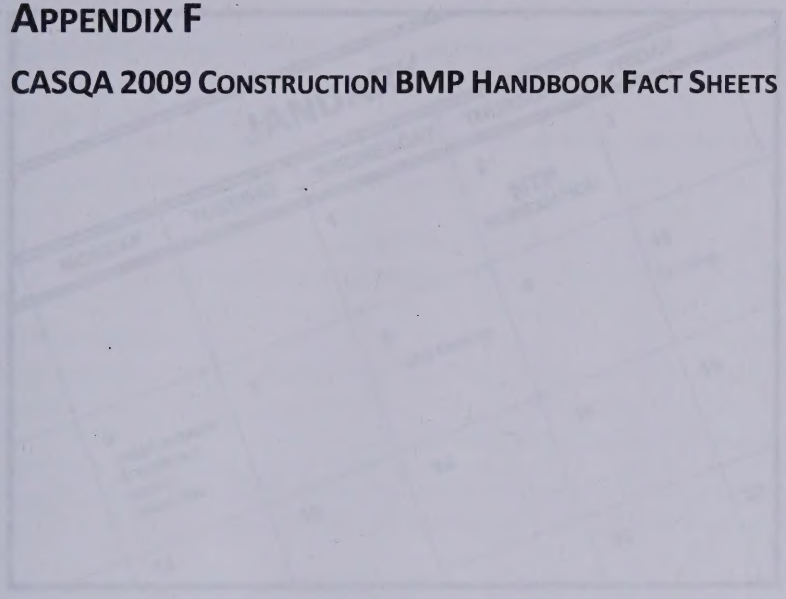
APPENDIX E

CONSTRUCTION ACTIVITIES, MATERIALS USED AND ASSOCIATED POLLUTANTS

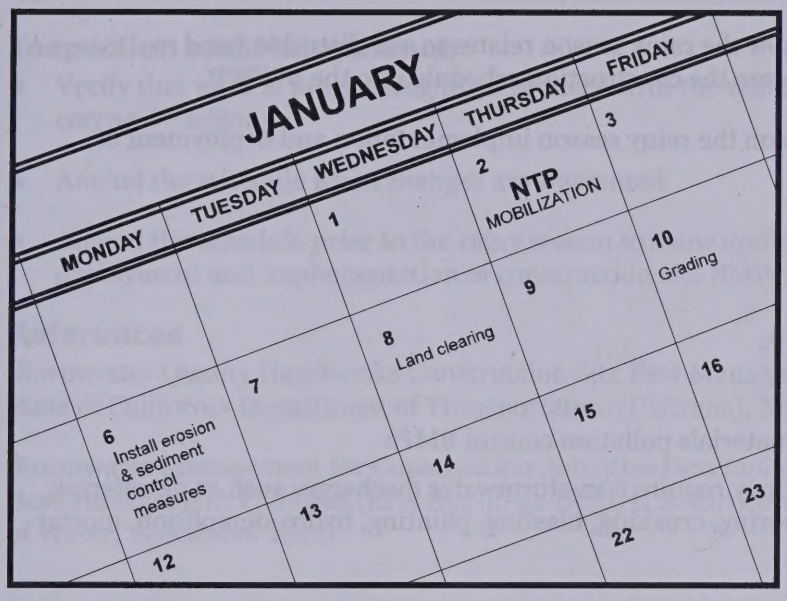
(Included in Section 2.5 of the text)

APPENDIX F

CASQA 2009 CONSTRUCTION BMP HANDBOOK FACT SHEETS



Scheduling EC-1



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

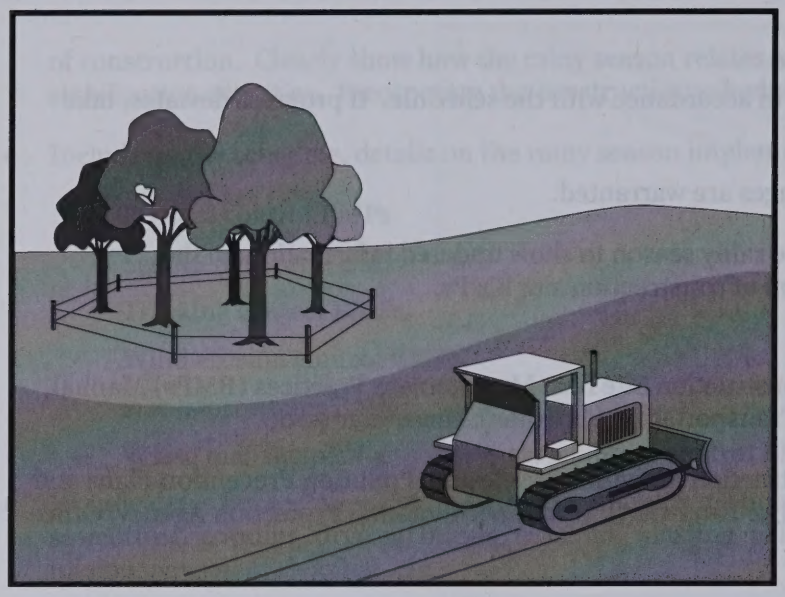
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ Primary Objective

☒ Secondary Objective

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Limitations

- Requires forward planning by the owner/developer,

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contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

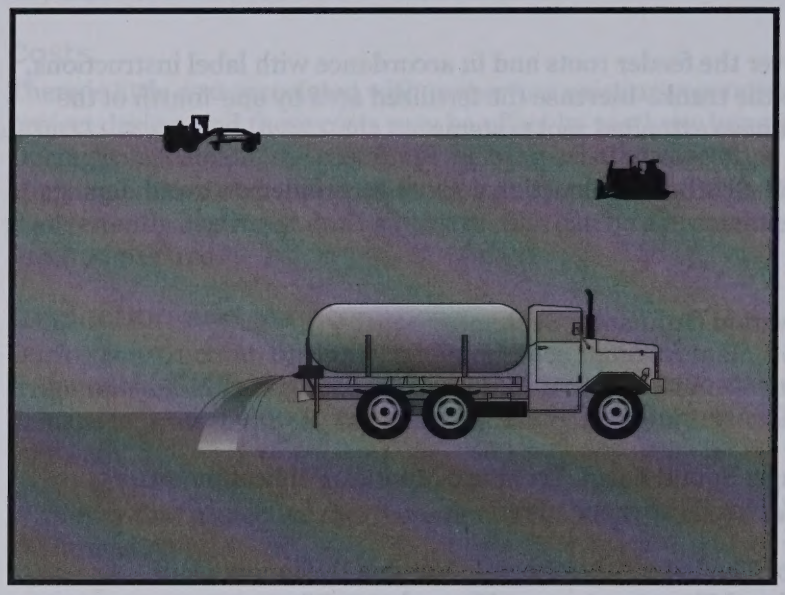
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Soil Binders EC-5



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-4 Hydroseeding
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching

Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time
- Soil stockpiles
- Temporary haul roads prior to placement of crushed rock
- Compacted soil road base
- Construction staging, materials storage, and layout areas

Limitations

- Soil binders are temporary in nature and may need reapplication.

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- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.
- Soil binders may not sufficiently penetrate compacted soils.
- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- The water quality impacts of some chemical soil binders are relatively unknown and some may have water quality impacts due to their chemical makeup.

Implementation

General Considerations

- Soil binders should conform to local municipality specifications and requirements.
- Site soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Material Safety Data Sheet (MSDS) from the manufacturer to ensure non-toxicity.
- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.
  - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.
  - Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.

- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

Plant-Material-Based (Short Lived, <6 months) Binders

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (H:V):	Flat	4:1	3:1	2:1	1:1
lb/acre:	40	45	50	60	70

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together, but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

Plant-Material-Based (Long Lived, 6-12 months) Binders

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1 part emulsion
- For sandy soil: 10 parts water to 1 part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

Polymeric Emulsion Blend Binders

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1 part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations, and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (H:V)	lb/acre
Flat to 5:1	3.0 – 5.0
5:1 to 3:1	5.0 – 10.0
2:1 to 1:1	10.0 – 20.0

Poly-Acrylamide (PAM) and Copolymer of Acrylamide: Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:

- Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.

- The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.

- PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".

- PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

Cementitious-Based Binders

Gypsum: This is a formulated gypsum based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

Applying Soil Binders

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.
- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.
- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.

- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd² or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 6 to 12 in.
  - Allow treated area to cure for the time recommended by the manufacturer; typically at least 24 hours.
  - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd².

Costs

Costs vary according to the soil stabilizer selected for implementation. The following are approximate installed costs:

Soil Binder	Cost per Acre (2000)[1]	Estimated Cost per Acre (2009)[2]
Plant-Material-Based (Short Lived) Binders	$700-$900	$770-$990
Plant-Material-Based (Long Lived) Binders	$1,200-$1,500	$1,320-$1,650
Polymeric Emulsion Blend Binders	$700 -$1,500	$770-$1,650
Cementitious-Based Binders	$800-$1,200	$880-$1,350

1. Source: Erosion Control Pilot Study Report, Caltrans, June 2000.

2. 2009 costs reflect a 10% escalation over year 2000 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Reapply the selected soil binder as needed to maintain effectiveness.

Table 1 Properties of Soil Binders for Erosion Control				
Evaluation Criteria	**Binder Type**			
	Plant Material Based (Short Lived)	**Plant Material Based (Long Lived)**	**Polymeric Emulsion Blends**	**Cementitious-Based Binders**
Relative Cost	Low	Moderate to High	Low to High	Low to Moderate
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies (1)	Varies (1)	Varies (1)	4,000 to 12,000 lbs/acre

(1) See Implementation for specific rates.

References

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

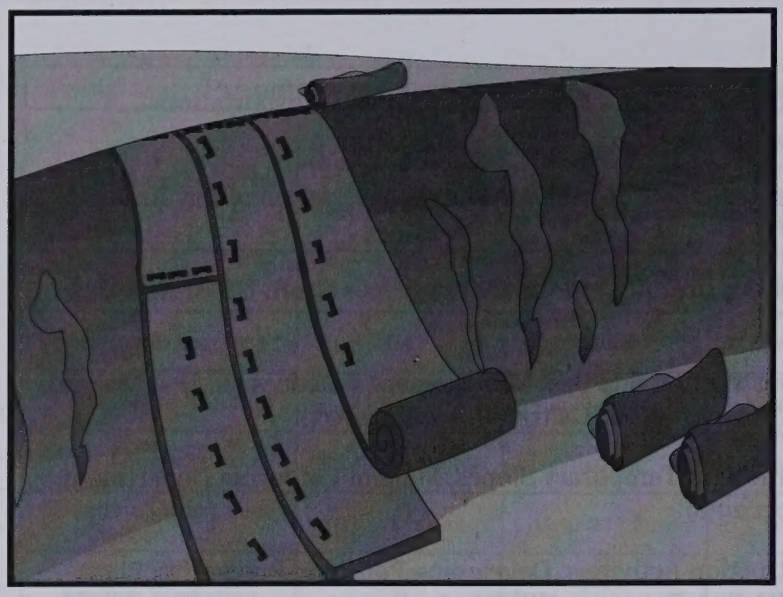
Sedimentation and Erosion Control, An Inventory of Current Practices Draft, US EPA, April 1990.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Geotextiles and Mats EC-7



Categories

EC	Erosion Control	☑
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WE	Wind Erosion Control	☒
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Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

Description and Purpose

Mattings, or Rolled Erosion Control Products (RECPs), can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

Suitable Applications

RECPs are typically applied on slopes where erosion hazard is high and vegetation will be slow to establish. Mattings are also used on stream banks, swales and other drainage channels where moving water at velocities between 3 ft/s and 6 ft/s are likely to cause scour and wash out new vegetation, and in areas where the soil surface is disturbed and where existing vegetation has been removed. RECPs may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). RECPs should be considered when the soils are fine grained and potentially erosive. RECPs should be considered in the following situations.

- Steep slopes, generally steeper than 3:1 (H:V)
- Slopes where the erosion potential is high
- Slopes and disturbed soils where mulch must be anchored
- Disturbed areas where plants are slow to develop

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- Channels with flows exceeding 3.3 ft/s
- Channels to be vegetated
- Stockpiles
- Slopes adjacent to water bodies

Limitations

- RECP installed costs are generally higher than other erosion control BMPs, limiting their use to areas where other BMPs are ineffective (e.g. channels, steep slopes).
- RECPs may delay seed germination, due to reduction in soil temperature.
- RECPs are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (since staples and netting can catch in mowers). If a staple or pin cannot be driven into the soil because the underlying soil is too hard or rocky, then an alternative BMP should be selected.
- If used for temporary erosion control, RECPs should be removed and disposed of prior to application of permanent soil stabilization measures.
- The use of plastic should be limited to covering stockpiles or very small graded areas for short periods of time (such as through one imminent storm event) until more environmentally friendly measures, such as seeding and mulching, may be installed.
    - Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
    - Plastic sheeting results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- RECPs may have limitations based on soil type, slope gradient, or channel flow rate; consult the manufacturer for proper selection.
- Not suitable for areas that have foot traffic (tripping hazard) – e.g., pad areas around buildings under construction.
- RECPs that incorporate a plastic netting (e.g. straw blanket typically uses a plastic netting to hold the straw in place) may not be suitable near known wildlife habitat. Wildlife can become trapped in the plastic netting.
- RECPs may have limitations in extremely windy climates. However, when RECPs are properly trenched at the top and bottom and stapled in accordance with the manufacturer's recommendations, problems with wind can be minimized.

Implementation

Material Selection

- Natural RECPs have been found to be effective where re-vegetation will be provided by re-seeding. The choice of material should be based on the size of area, side slopes, surface conditions such as hardness, moisture, weed growth, and availability of materials.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.
- The following natural and synthetic RECPs are commonly used:

Geotextiles

- Material can be a woven or a non-woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp), 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets must be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under geotextile. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Geotextiles may be reused if they are suitable for the use intended.

Plastic Covers

- Generally plastic sheeting should only be used as stockpile covering or for very small graded areas for short periods of time (such as through one imminent storm event). If plastic sheeting must be used, choose a plastic that will withstand photo degradation.
- Plastic sheeting should have a minimum thickness of 6 mils, and must be keyed in at the top of slope (when used as a temporary slope protection) and firmly held in place with sandbags or other weights placed no more than 10 ft apart. Seams are typically taped or weighted down their entire length, and there should be at least a 12 in. to 24 in. overlap of all seams. Edges should be embedded a minimum of 6 in. in soil (when used as a temporary slope protection).
- All sheeting must be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures must be repaired immediately. If washout or breakages occur, the material should be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable RECPs are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable. See typical installation details at the end of this fact sheet.

- Jute is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. The performance of jute as a stand-alone RECP is low. Most other RECPs outperform jute as a temporary erosion control product and therefore jute is not commonly used. It is designed to be used in conjunction with vegetation. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- Excelsior (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life. Excelsior blankets should be furnished in rolled strips, a minimum of 48 in. wide, and should have an average weight of 0.8 lb/yd^2, ±10 percent, at the time of manufacture. Excelsior blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Straw blanket should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket. Straw blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Wood fiber blanket is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- Coconut fiber blanket should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed over the entire area of the blanket. Coconut fiber blanket should be furnished in rolled strips with a minimum of 6.5 ft wide, a minimum of 80 ft. long and a minimum of 0.5 lb/yd^2. Coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Coconut fiber mesh is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- Straw coconut fiber blanket should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well.

  - Plastic netting is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - Plastic mesh is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - Synthetic fiber with netting is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - Bonded synthetic fibers consist of a three dimensional geomatrix nylon (or other synthetic) matting. Typically it has more than 90 percent open area, which facilitates root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - Combination synthetic and biodegradable RECPs consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips,

which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Site Preparation

- Proper soil preparation is essential to ensure complete contact of the RECP with the soil. Soil Roughening is not recommended in areas where RECPs will be installed.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 2 to 3 in. of topsoil.

Seeding/Planting

Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation must be re-seeded. Where soil filling is specified for turf reinforcement mats (TRMs), seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Check Slots

Check slots shall be installed as required by the manufacturer.

Laying and Securing Matting

- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.
- Mechanical or manual lay down equipment should be capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Anchoring

- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Wire staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Metal stake pins should be 0.188 in. diameter steel with a 1.5 in. steel washer at the head of the pin, and 8 in. in length.
- Wire staples and metal stakes should be driven flush to the soil surface.

Installation on Slopes

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Begin at the top of the slope and anchor the blanket in a 6 in. deep by 6 in. wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket down slope in the direction of water flow.
- Overlap the edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft (or greater, per manufacturer's specifications).
- When blankets must be spliced, place blankets end over end (shingle style) with 6 in. overlap. Staple through overlapped area, approximately 12 in. apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples should be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (H:V) to 2:1 (H:V), require a minimum of 2 staples/yd^2. Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd^2. Check manufacturer's specifications to determine if a higher density staple pattern is required.

Installation in Channels

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Dig initial anchor trench 12 in. deep and 6 in. wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 6 in. deep and 6 in. wide across the channel at 25 to 30 ft intervals along the channels.
- Cut longitudinal channel anchor trenches 4 in. deep and 4 in. wide along each side of the installation to bury edges of matting, whenever possible extend matting 2 to 3 in. above the crest of the channel side slopes.
- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 12 in. intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 in.
- Secure these initial ends of mats with anchors at 12 in. intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 3 in. overlap.

- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 12 in. intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 6 in. centers at 25 to 30 ft. intervals in lieu of excavated check slots.
- Staple shingled lap spliced ends a minimum of 12 in. apart on 12 in. intervals.
- Place edges of outside mats in previously excavated longitudinal slots; anchor using prescribed staple pattern, backfill, and compact soil.
- Anchor, fill, and compact upstream end of mat in a 12 in. by 6 in. terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement mat (TRM))

Installation should be in accordance with the manufacturer's recommendations. Typical installation guidelines are as follows:

- After seeding, spread and lightly rake ½-3/4 inches of fine topsoil into the TRM apertures to completely fill TRM thickness. Use backside of rake or other flat implement.
- Alternatively, if allowed by product specifications, spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment.
- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.
- Avoid any traffic over matting if loose or wet soil conditions exist.
- Use shovels, rakes, or brooms for fine grading and touch up.
- Smooth out soil filling just exposing top netting of mat.

Temporary Soil Stabilization Removal

- Temporary soil stabilization removed from the site of the work must be disposed of if necessary.

Costs

Installed costs can be relatively high compared to other BMPs. Approximate costs for installed materials are shown below:

Rolled Erosion Control Products		Installed Cost per Acre (2000)[1]	Estimated Cost per Acre (2009)[2]
Biodegradable	Jute Mesh	$6,000-$7,000	$6,600-$7,700
	Curled Wood Fiber	$8,000-$10,500	$8,800-$11,050
	Straw	$8,000-$10,500	$8,800-$11,050
	Wood Fiber	$8,000-$10,500	$8,800-$11,050
	Coconut Fiber	$13,000-$14,000	$14,300-$15,400
	Coconut Fiber Mesh	$30,000-$33,000	$33,000-$36,300
	Straw Coconut Fiber	$10,000-$12,000	$11,000-$13,200
Non-Biodegradable	Plastic Netting	$2,000-$2,200	$2,200-$2,220
	Plastic Mesh	$3,000-$3,500	$3,300-$3,850
	Synthetic Fiber with Netting	$34,000-$40,000	$37,400-$44,000
	Bonded Synthetic Fibers	$45,000-$55,000	$49,500-$60,500
	Combination with Biodegradable	$30,000-$36,000	$33,000-$39,600

1. Source: Erosion Control Pilot Study Report, Caltrans, June 2000.

2. 2009 costs reflect a 10% escalation over year 2000 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

Inspection and Maintenance

- RECPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.
- Make sure matting is uniformly in contact with the soil.
- Check that all the lap joints are secure.
- Check that staples are flush with the ground.

References

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Guides for Erosion and Sediment Controls in California, USDA Soils Conservation Service, January 1991.

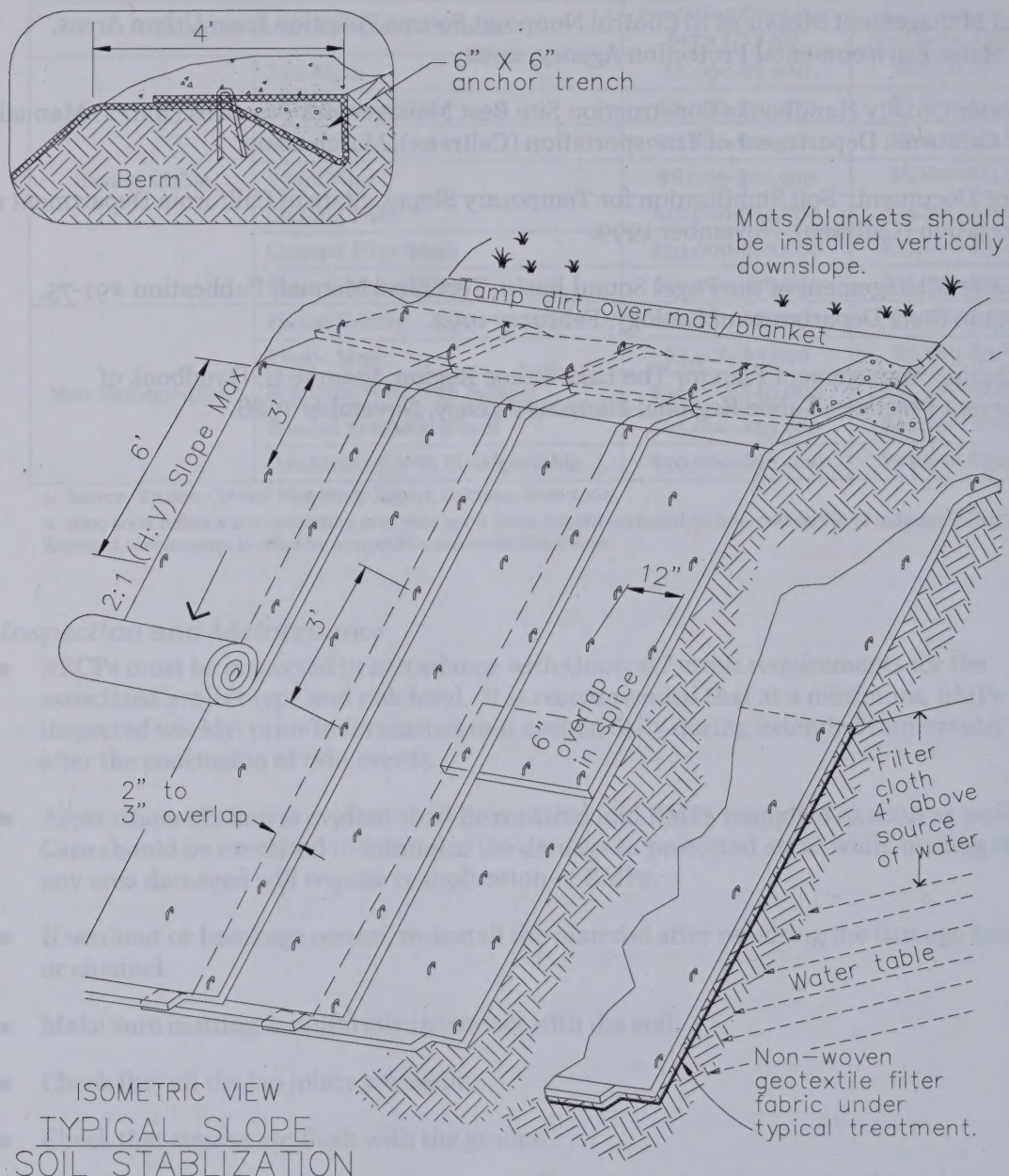
National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



ISOMETRIC VIEW

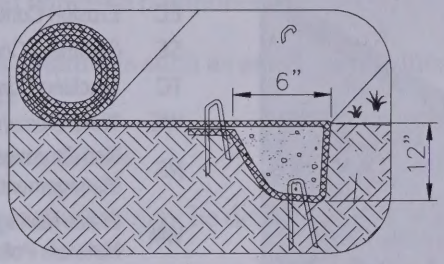
TYPICAL SLOPE
SOIL STABLIZATION
NTS

WET SLOPE LINING
NTS

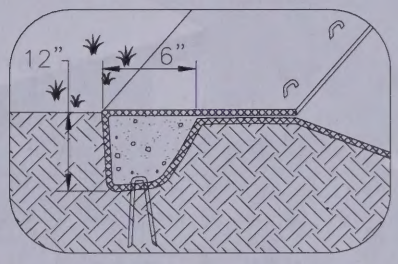
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

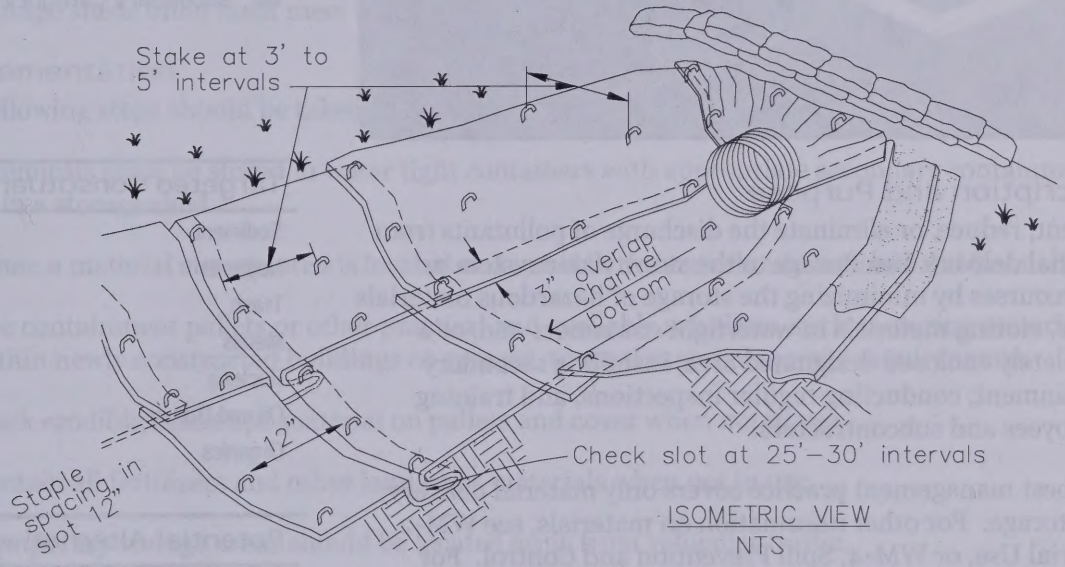
TYPICAL INSTALLATION DETAIL



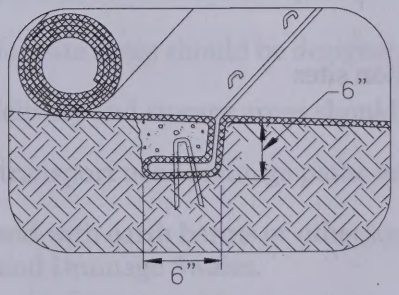
INITIAL CHANNEL ANCHOR TRENCH
NTS



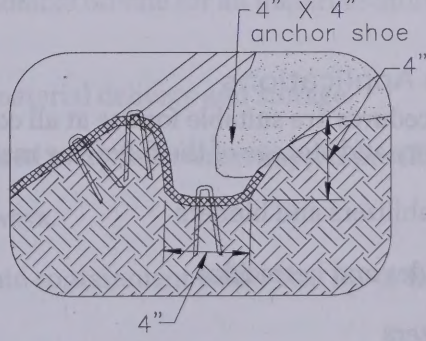
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS

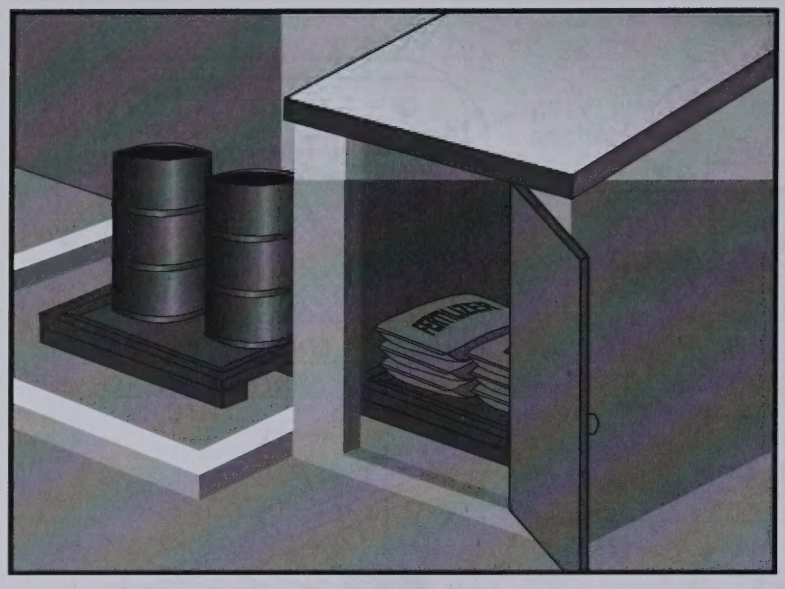


LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers' specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL

Material Delivery and Storage WM-1



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
  - Avoid transport near drainage paths or waterways.
  - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
  - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References

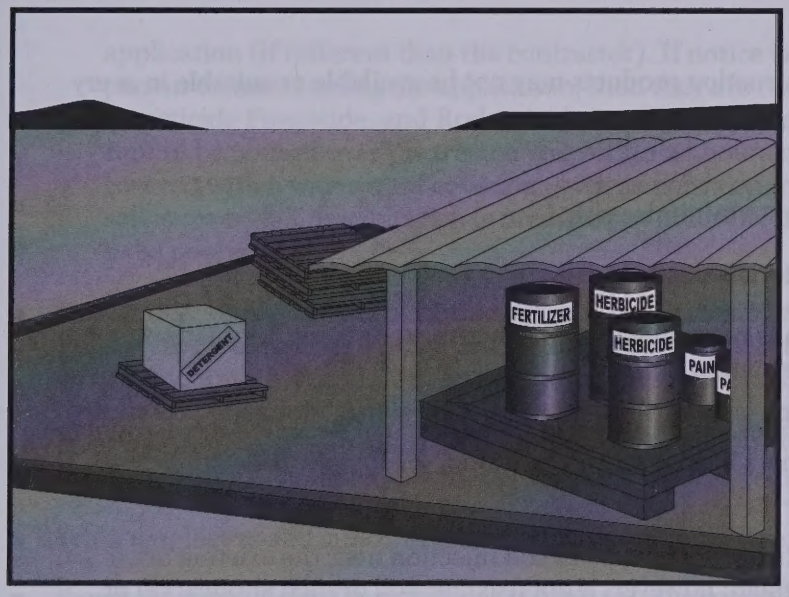
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Material Use WM-2



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Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

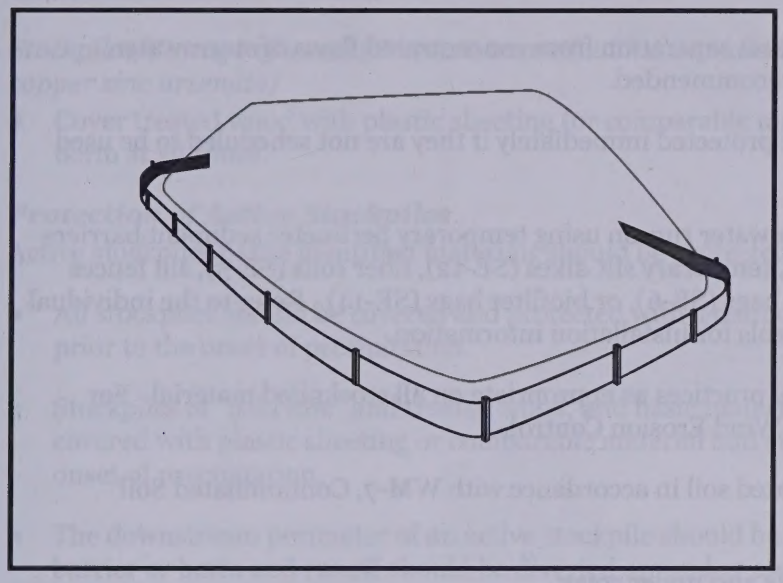
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Cover and project soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

Stockpiles of fly ash, stucco, hydrated lime

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

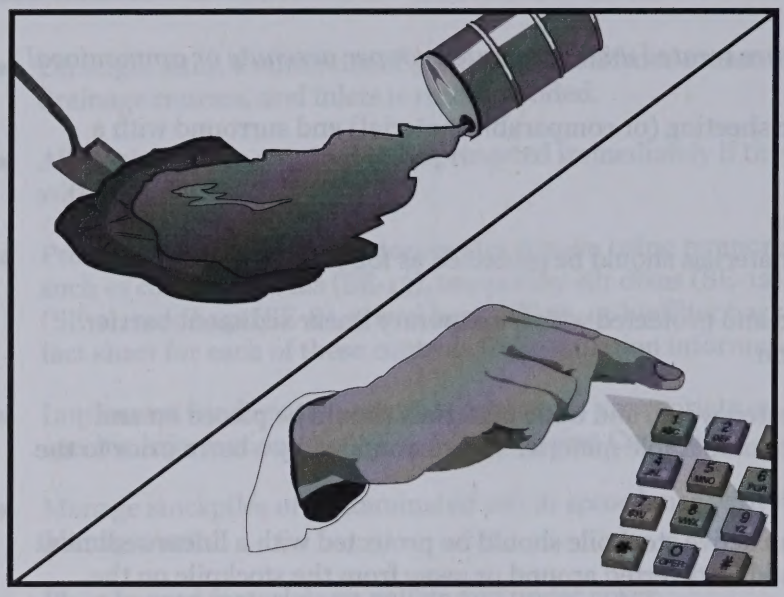
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

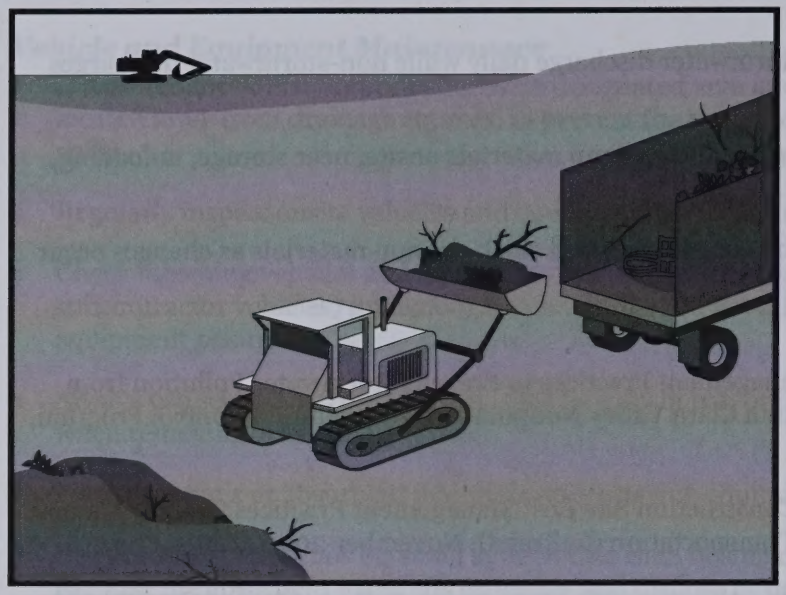
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

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plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

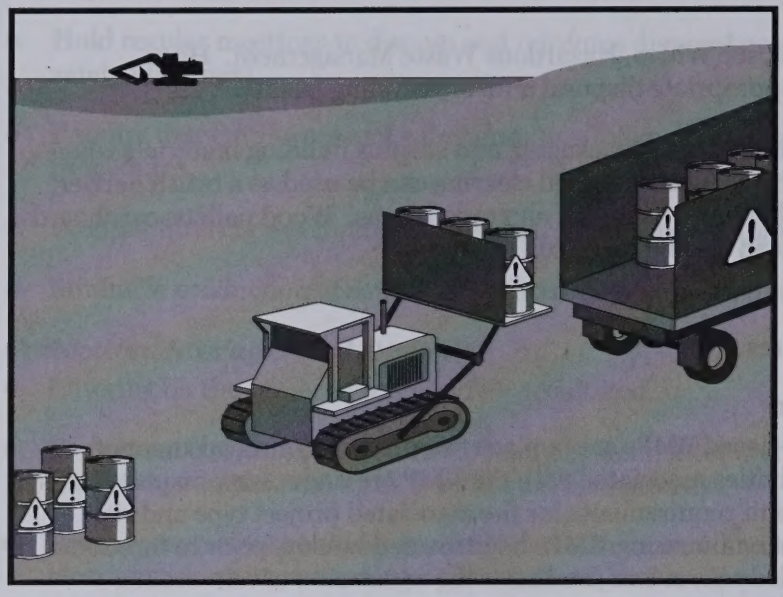
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Hazardous Waste Management WM-6



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

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In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
  - Ensure that adequate hazardous waste storage volume is available.
  - Ensure that hazardous waste collection containers are conveniently located.
  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
  - Minimize production or generation of hazardous materials and hazardous waste on the job site.
  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
  - Segregate potentially hazardous waste from non-hazardous construction site debris.
  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

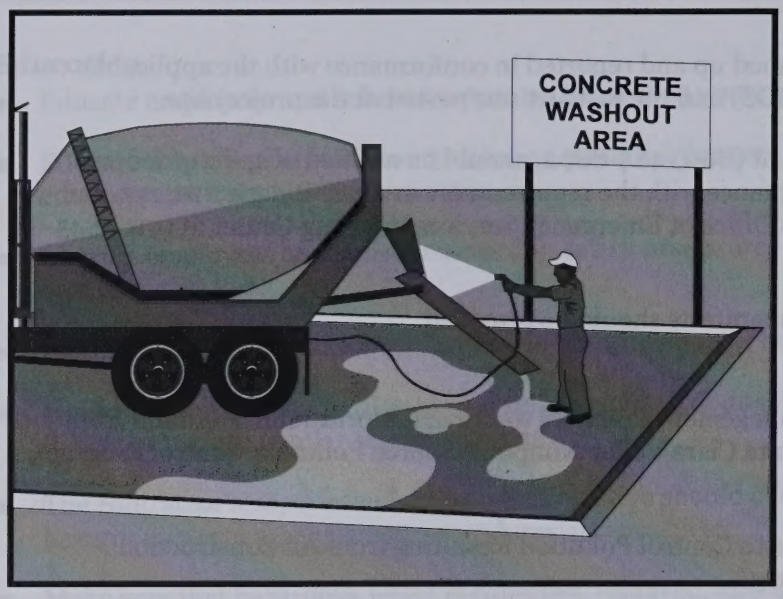
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

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- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washout should be lined so there is no discharge into the underlying soil.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a "roll-off"; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

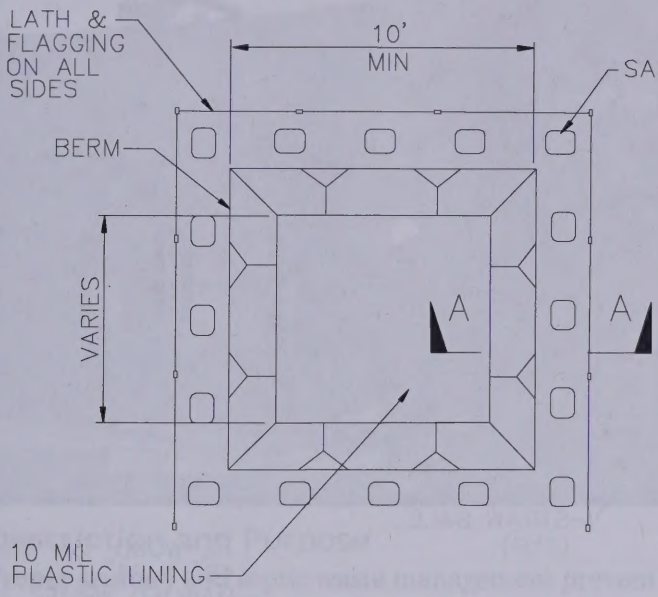
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.
- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



PLAN
NOT TO SCALE
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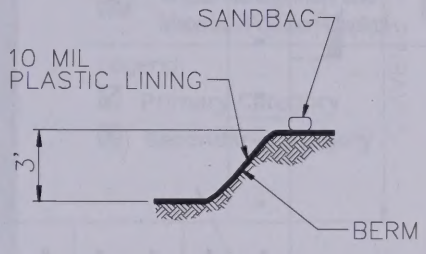
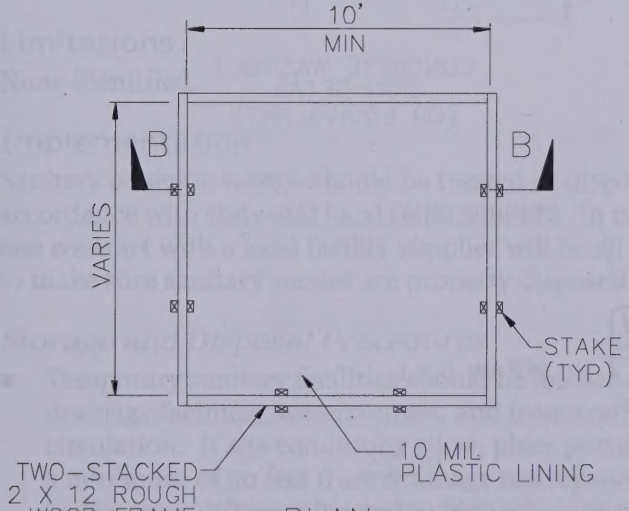
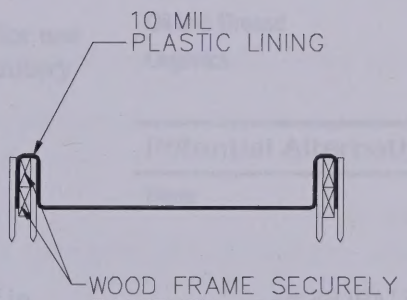


SECTION A–A
NOT TO SCALE



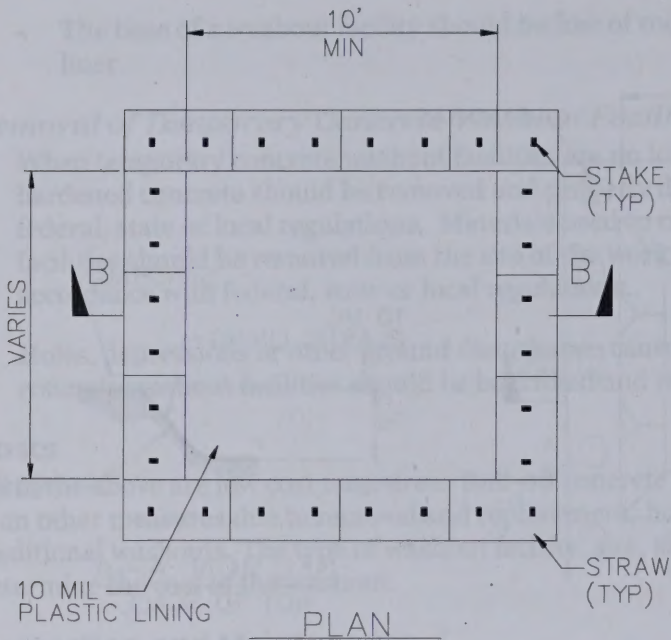
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



SECTION B–B
NOT TO SCALE

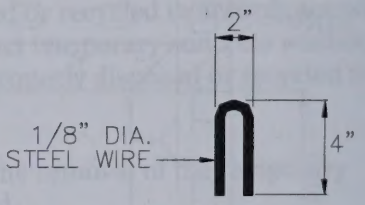
NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

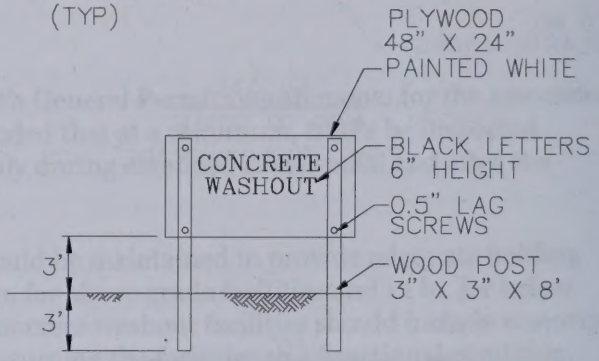


PLAN
NOT TO SCALE

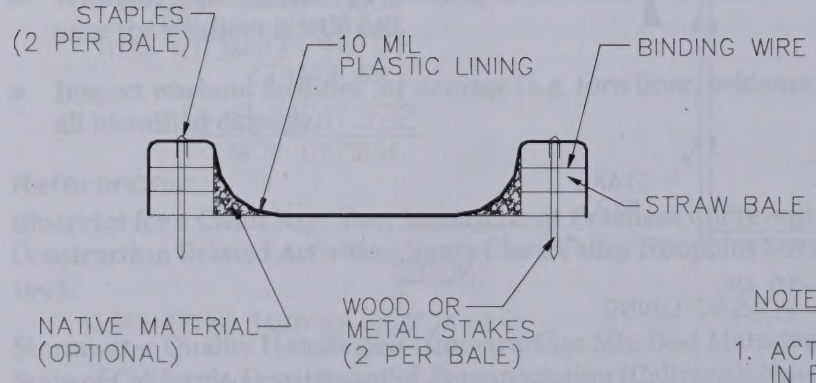
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

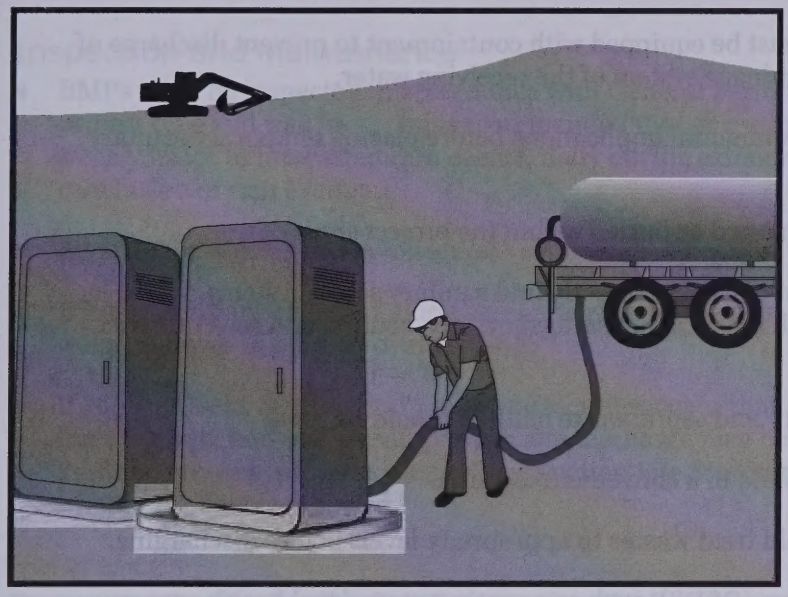


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

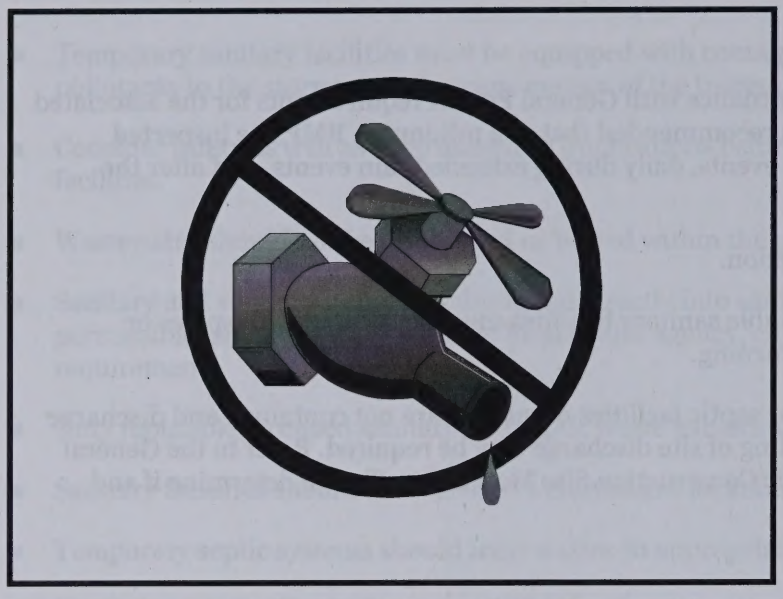
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Water Conservation Practices NS-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

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into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Illicit Connection/Discharge NS-6

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

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of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General** – unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

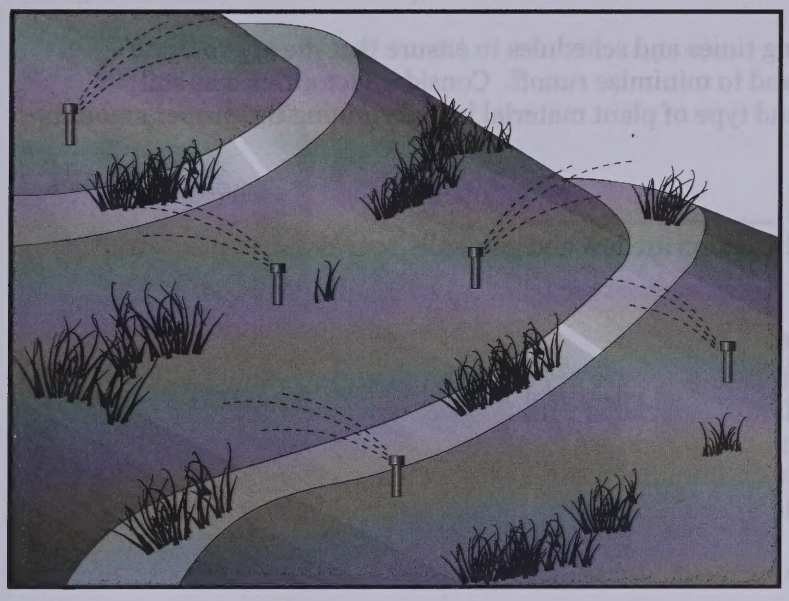
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water/Irrigation NS-7



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for

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excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

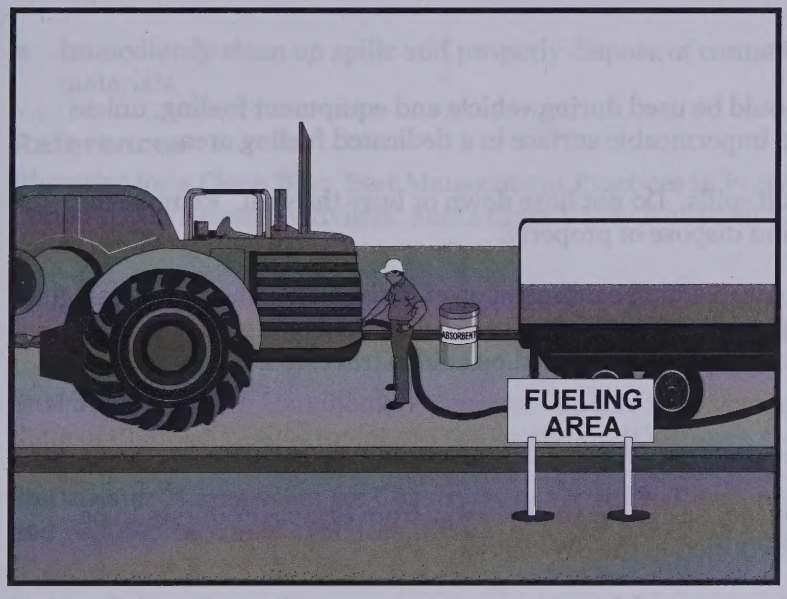
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Fueling NS-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

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be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

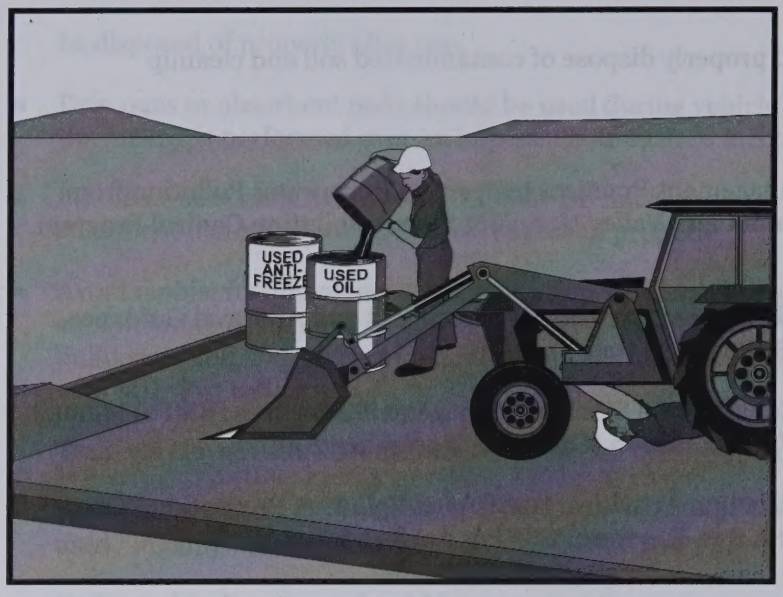
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

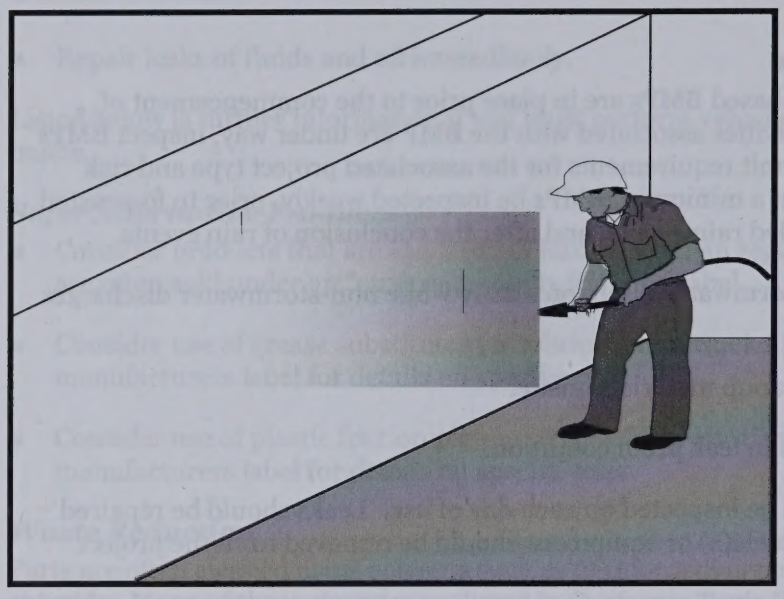
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Concrete Curing NS-12



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

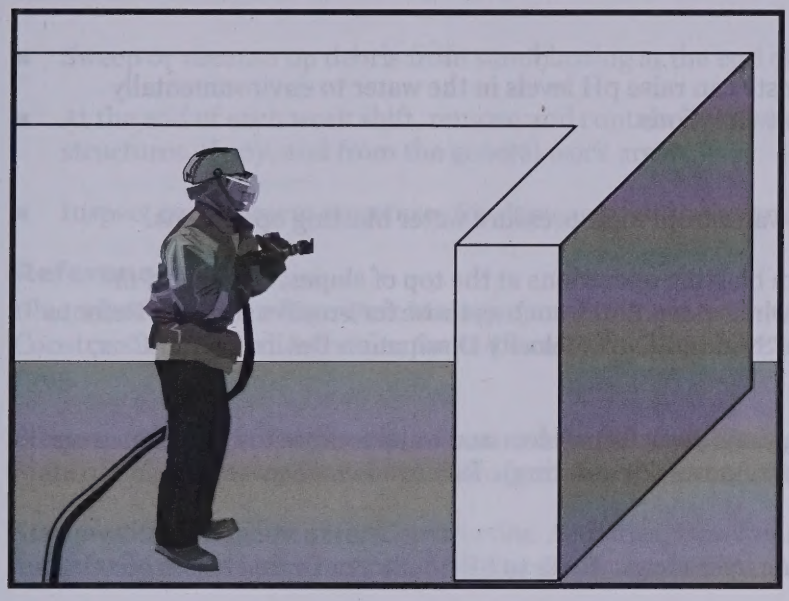
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

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Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

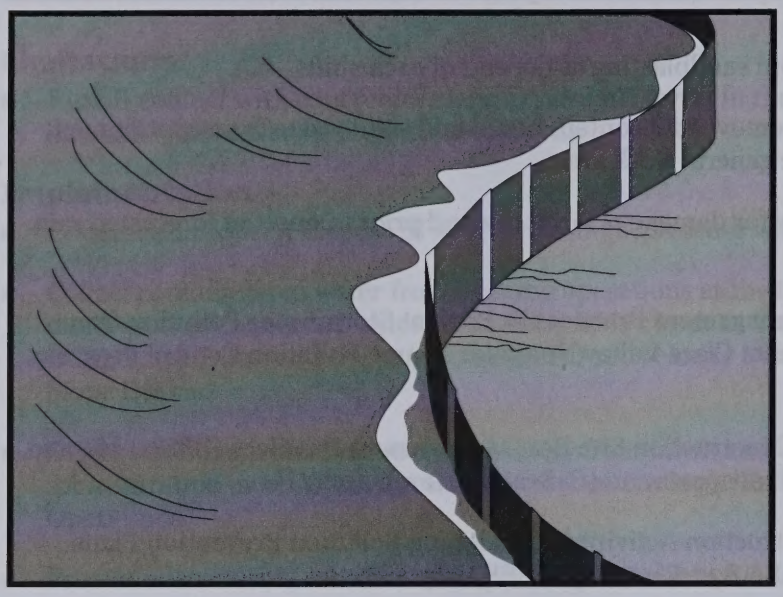
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Silt Fence SE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
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Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-10 Storm Drain Inlet Protection
- SE-14 Biofilter Bags

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The

reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec^{-1} and 0.15 sec^{-1} in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.

- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with native material and compacted.

- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the

toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of $^1/_3$ and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the gerotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
    - Minimal soil disturbance.
    - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
    - Uniform installation.
    - Less susceptible to undercutting/undermining.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Silt Fence

SE-1

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier. In no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

CROSS BARRIER DETAIL

SECTION C–C

Silt Fence

SE-1

SECTION A–A

DETAIL A

JOINING SECTION DETAIL (TOP VIEW)

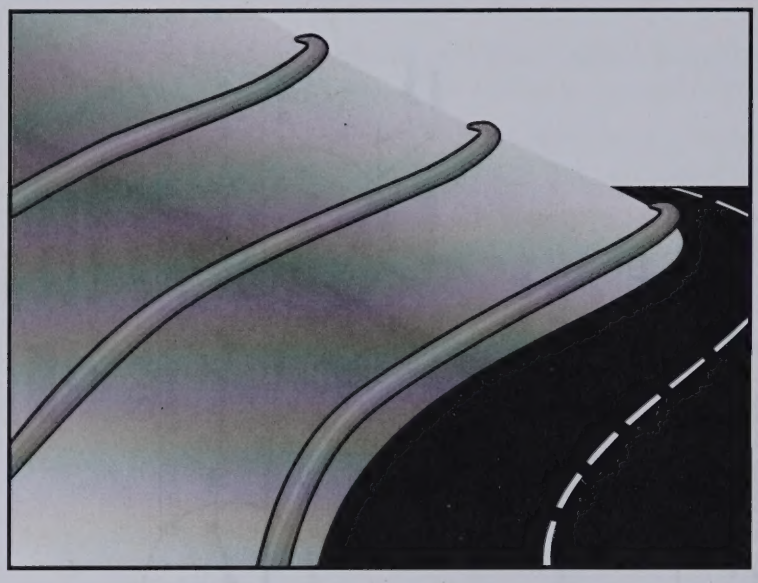
END STAKE DETAIL (TOP VIEW)

END DETAIL

STAPLE DETAIL
(SEE NOTE 9)

OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

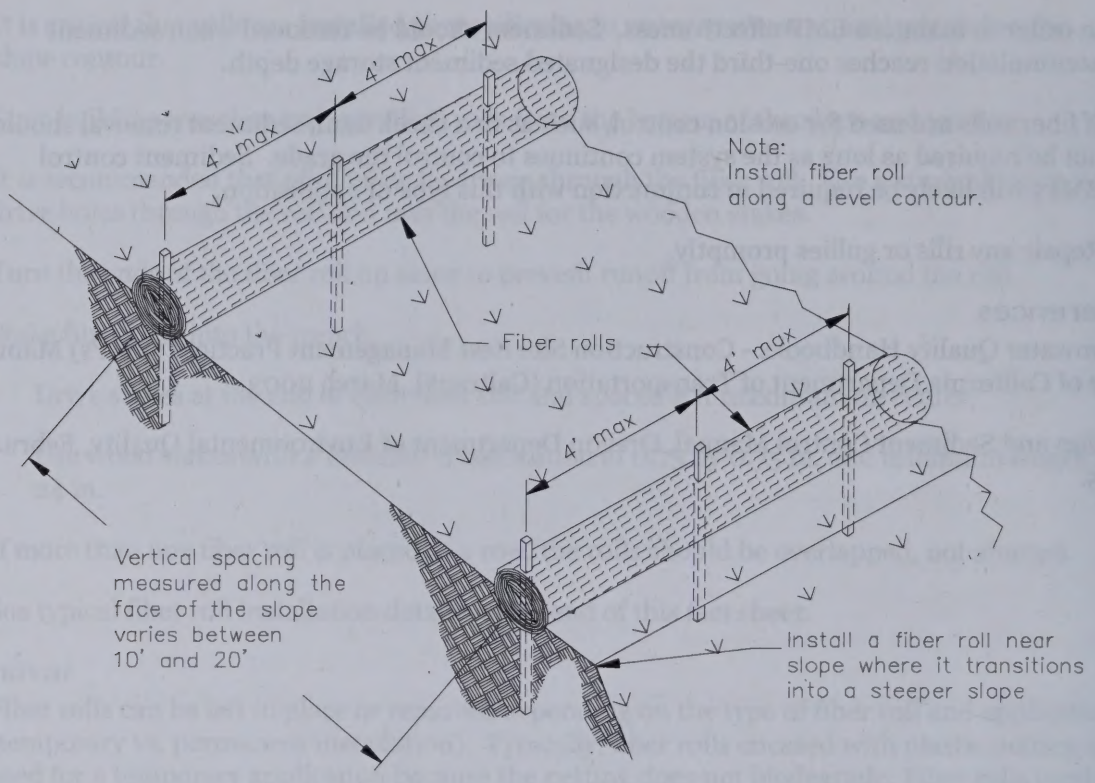
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

References

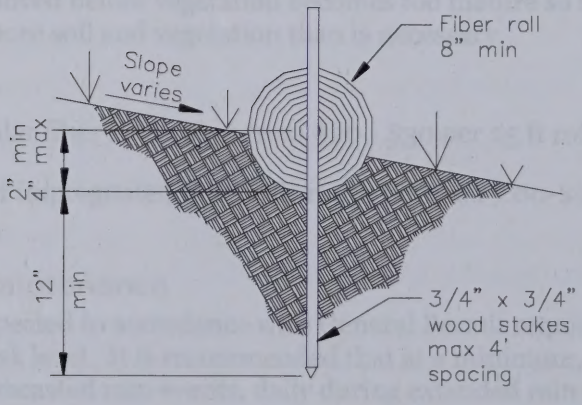
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION

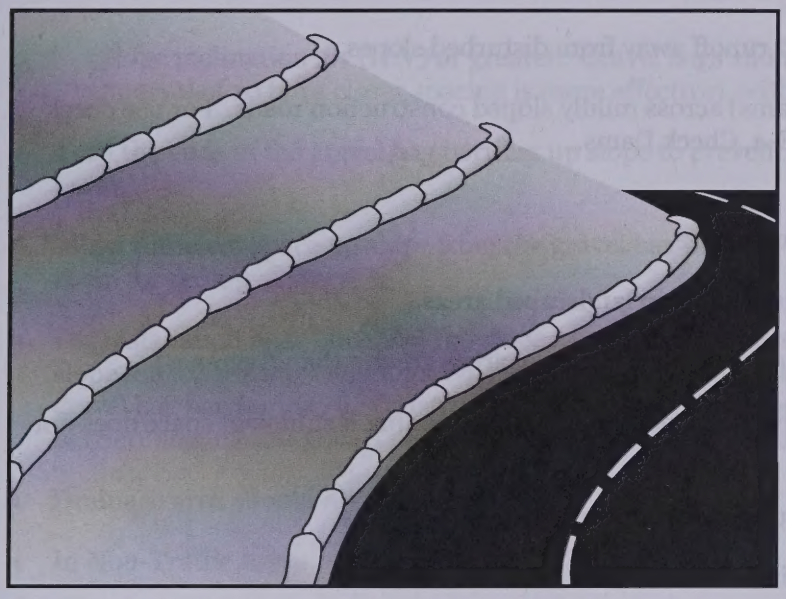
N.T.S.



ENTRENCHMENT DETAIL

N.T.S.

Gravel Bag Berm SE-6



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Roll
SE-8 Sandbag Barrier
SE-14 Biofilter Bags

Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- *Bag Material:* Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- *Bag Size:* Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.
- *Fill Material:* Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7

Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

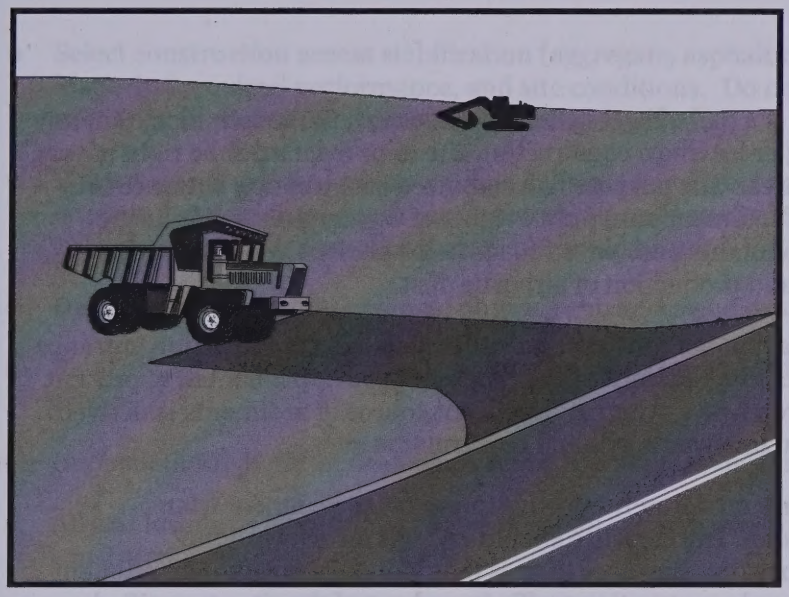
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Stabilized Construction Entrance/Exit TC-1



Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

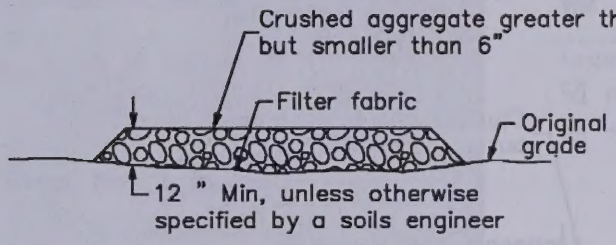
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

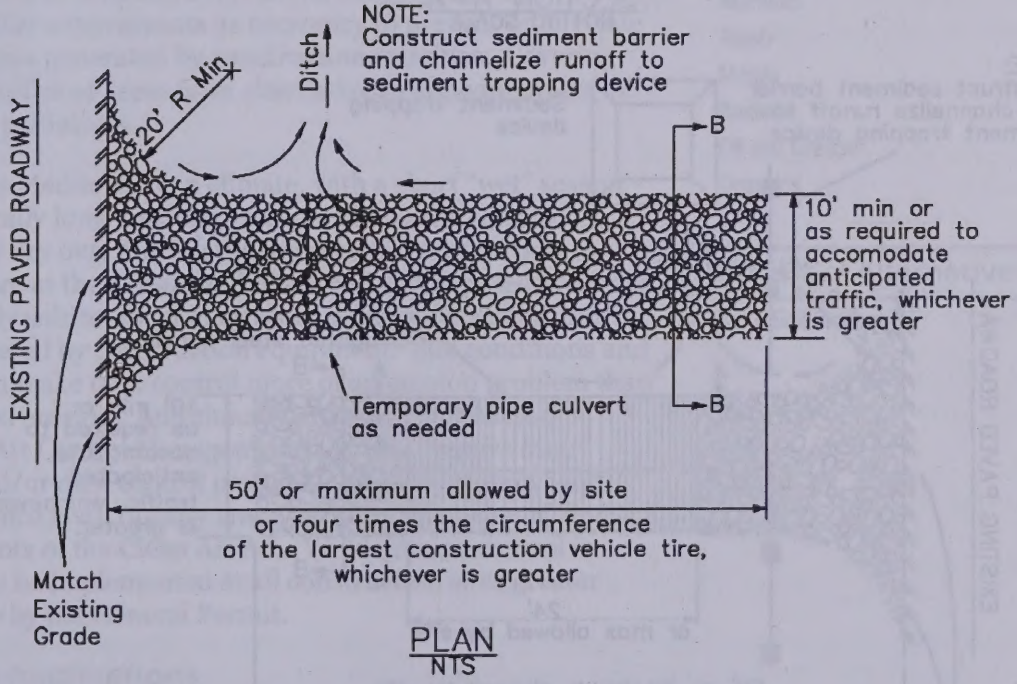
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance/Exit TC-1

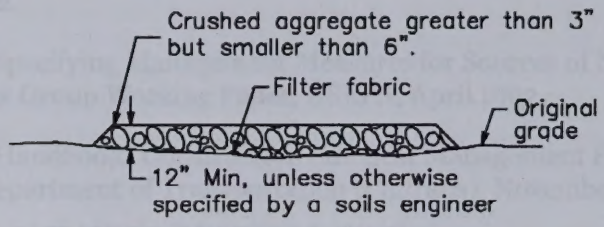

Crushed aggregate greater than 3" but smaller than 6"
Filter fabric
Original grade
12 " Min, unless otherwise specified by a soils engineer

SECTION B–B
NTS

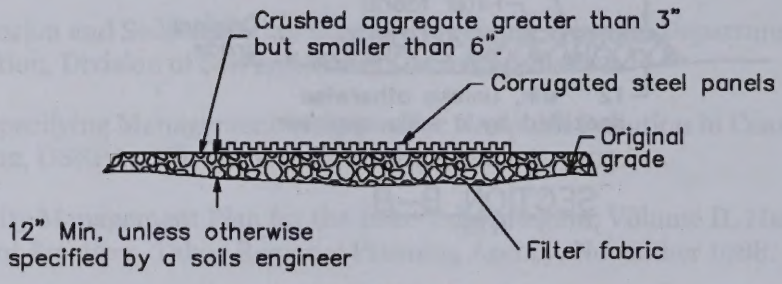

NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Ditch
20' R Min
EXISTING PAVED ROADWAY
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater
Temporary pipe culvert as needed
50' or maximum allowed by site
or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade

PLAN
NTS

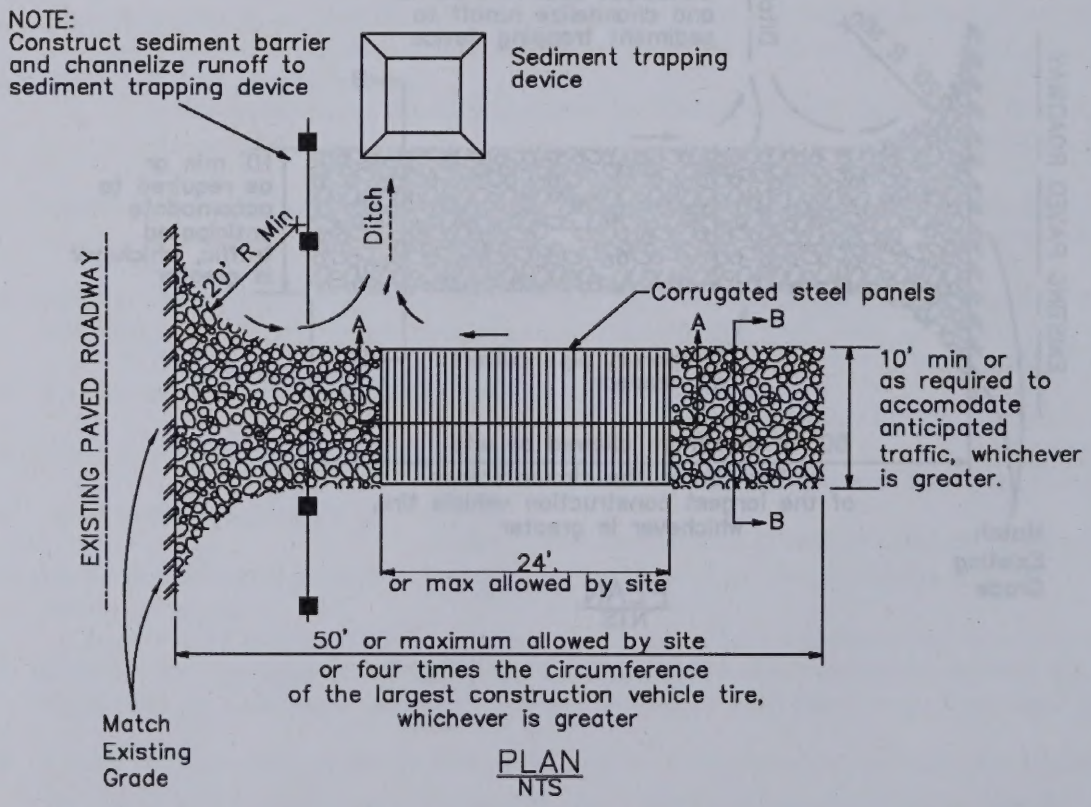
Stabilized Construction Entrance/Exit TC-1


Crushed aggregate greater than 3" but smaller than 6".
Filter fabric
Original grade
12" Min, unless otherwise specified by a soils engineer

SECTION B–B
NTS

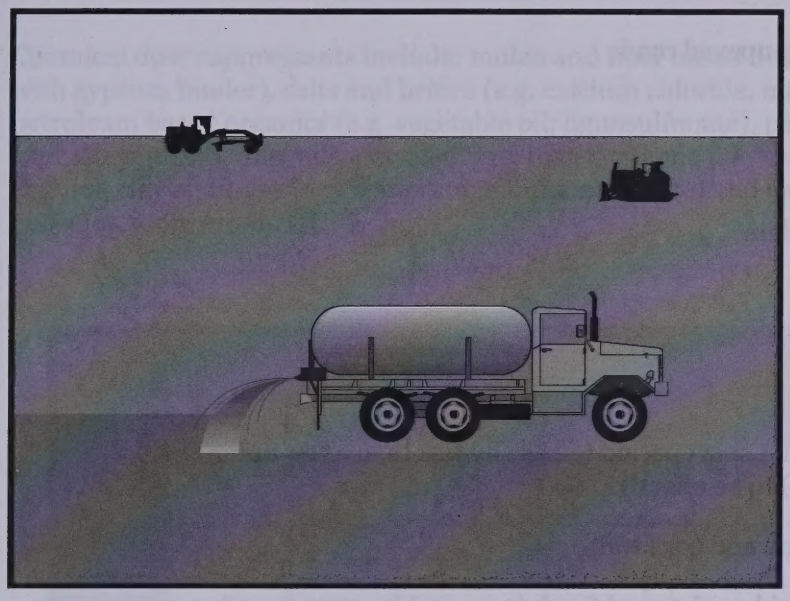

Crushed aggregate greater than 3" but smaller than 6".
Corrugated steel panels
Original grade
12" Min, unless otherwise specified by a soils engineer
Filter fabric

SECTION A–A
NOT TO SCALE


NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Sediment trapping device
Ditch
20' R Min
EXISTING PAVED ROADWAY
Corrugated steel panels
A
A
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater.
24', or max allowed by site
50' or maximum allowed by site
or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade

PLAN
NTS

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	x	x	x	x	x			x
Disturbed Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Clearing/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

APPENDIX G

RESPONSIBLE PARTIES

(Included in Section 6 of the text)

Responsible Parties

Title and Contact Information	Area of Responsibility
Legally Responsible Person: Entity Name: Southern California Edison Contact Person: TBD Address: 14005 South Benson Avenue City, State, Zip: Chino, CA 91710 Telephone Number: Fax: Email:	Property Owner and Permittee under the General Permit
Authorized Signatory for the LRP: Contact Person: N/A Address: City, State, Zip: Telephone Number: Fax: Email:	Authorized to sign (and certify) on behalf of the LRP: the Notice of Intent, Notice of Termination, Changes to the Permit Registration Documents, SWPPP Certification, Annual Reports, Non-Compliance reports, and any other information requested by the RWQCB, SWRCB, or EPA under the General Permit.
Qualified SWPPP Developer: Company Name: AEI-CASC Consulting QSD Name: Alan Batdorf, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (949) 453-1783 Cell: (949) 648-6695 Fax: (949) 453-1783 Email: abatdorf@aei-casc.com	Draft the SWPPP and any SWPPP amendments and certify compliance of the SWPPP with the General Permit.
Qualified SWPPP Practitioner: Company Name: Southern California Edison QSP Name: John Slayton, CPESC Address: 14005 South Benson Avenue City, State, Zip: Chino, CA, 91710 Telephone Number (including emergency contact number[s]): (310) 990-1745 Fax: Email: john.slayton@sce.com	Implement the SWPPP on a daily basis at the Project, oversee the training of contractors and other personnel undertaking SWPPP-related duties, monitor and direct contractors with SWPPP responsibilities (including those installing or maintaining BMPs), oversee the inspection and monitoring programs, perform inspections or delegate others to do so (see other delegated inspectors below), prepare reports required by the SWPPP for review and certification by the LRP's representative.

Title and Contact Information	Area of Responsibility
SWPPP Inspector(s): Company Name: AEI-CASC Consulting QSP Name: Matt Renaud, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (818) 263-3566 Fax: (949) 453-1860 Email: mrenaud@aei-casc.com	Conduct inspections under the supervision of the QSP.
Alternate SWPPP Inspector(s): Company Name: AEI-CASC Consulting QSP Name: Michael O'Hearn, CESSWI Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (714) 497-7276 Fax: (909) 783-0108 Email: mohearn@aei-casc.com	Conduct inspections under the supervision of the QSP.
Contractor/Subcontractor Company Name: QSD Name: Address: City, State, Zip: Telephone Number (including emergency contact number[s]): Fax: Email:	Install, maintain, and replace erosion and sediment controls.

AMENDMENT NO. 2 TO

SOUTHERN CALIFORNIA EDISON COMPANY

DELEGATION OF SIGNATURE AUTHORITY

TRANSMISSION AND DISTRIBUTION

WHEREAS, effective November 25, 2009, James A. Kelly, Senior Vice President ("the Responsible Officer") and Stephen E. Pickett, Senior Vice President and General Counsel of Southern California Edison Company (the "Company") executed a Delegation of Authority and accompanying matrix (The "Matrix") most recently amended on May 3, 2010 (collectively, the "Delegation of Signature Authority"), designating certain employees of the Company the authority to execute and deliver on behalf of the Company certain contracts and other instruments specified in the Matrix, in each case subject to the monetary and other limitations specified in the Matrix.[1,2]

WHEREAS, the Responsible Officer deems it necessary to amend and entirely restate the Matrix as described on the attached Exhibit A.

NOW, THEREFORE, the Matrix shall be amended and entirely restated as described on the attached Exhibit A.

FURTHER, except as otherwise hereby amended, the Delegation of Authority Resolution shall remain in full force and effect. The Delegation of Signature Authority may be amended from time to time, in whole or in part, by a writing executed by the parties then holding the titles of the signatories below. The Delegation of Signature Authority, this Amendment and all further amendments to the Delegation of Signature Authority shall expire on December 31, 2010.

Date: 9/2/10

James A. Kelly
Senior Vice President

Approved:

Date: 9/3/10

Stephen E. Pickett
Senior Vice President and General Counsel
Attachment

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1 Signature authority of SCE elected Vice Presidents is derived from the SCE Bylaws and not from this delegation. Consequently, any limitation on an officer's authority pursuant to this delegation is governed by internal company policy and would likely have no legal effect on outside parties.

2 To determine authority to sign documentation related to the settlement of any claim for or against SCE, or related to the prosecution or defense of any Small Claims Court litigation on SCE's behalf, see SCE Board Resolution "Authorization of Settlement of Claims," adopted on September 7, 2006.

SCE Transmission and Distribution
Signature Authorization Matrix and Supplementary Approval Guidelines
Pursuant to SCE Board Resolution "Delegations of Signature Authority"

Adopted on September 3, 2009[3]
As of August 23, 2010

EXHIBIT A

SAP PAYMENT AUTHORIZATIONS[4]

PROCUREMENT-PREQS & CHANGE ORDERS AUTHORIZATION LEVEL							
8	7	6	5	4	3	2	1
Unlimited	≤$2M	≤$1M	≤$500K	≤$250K	≤$100K	≤$25K	≤$5K
Bus Unit Sr. VP & VPs[5]	Director	MGR 2-3, MPP2-3, Construction Project Manager	SUP4, ENG5, TSP4, MGR1, ENG4, MPC3, MPP1	SUP3, TSP3, ENG3, MPC2	SUP1-2, APP2, TSP2	SES, Corporate Repr 3, CCM3, MPC1, PLA2, Planner-Power Systems 4	Admin. Support[6] Reporting to an M3 or Above

NON-PO PAYMENT AUTHORIZATIONS[7] AUTHORIZATION LEVEL							
8	7	6	5	4	3	2	1
Unlimited	≤$25M	≤$5M	≤$2M	≤$500K	≤$100K	≤$25K	≤$5K
Bus Unit Sr. VP & VPs[5]	Upon SCE Risk Management Committee Review & Approval	Upon SCE Risk Management Committee Review & Approval		Director	MGR3, Construction Project Manager	MGR2, MPP2	ENG4-5, MGR1, MPC2-3, MPP1, SUP2-4

3 To determine authority to sign documentation related to the settlement of any claim for or against SCE, or related to the prosecution or defense of any Small Claims Court litigation on SCE's behalf, see SCE Board Resolution "Authorization of Settlement of Claims," adopted on September 7, 2006.

4 Signature authority for SAP Purchase Requisitions (PREQ), Change Order, and Non Purchase Order (NPO) payment authorizations are approved in SAP via the Position Change Request Form (PCRF). An up-to-date list of authorized position numbers in SAP can be generated by running SAP transaction code ZHRAUDIT.

5 Signature authority of SCE elected Vice Presidents derives from SCE's by-laws and not from this delegation form.

6 In accordance with segregation of duty guidelines, PREQ maintainer and PREQ approver roles will not be granted to the employee concurrently.

7 Exceptions to the Non-PO payment authorization levels are named on Attachment 1.

CONTRACTS & OTHER INSTRUMENTS[8]

ADVANCED TECHNOLOGY				
Description	**Bus Unit Sr. VP/ VP**	**Director**	**MGR3**	**MGR2**
Confidentiality / Non-Disclosure Agreements	X	X		
Trial Use Agreements	X	X	X	
Agreements / Contracts to provide testing, research studies or engineering services to outside 3rd parties (e.g. DOE, CEC)	Unlimited	<$500K	<$100K	
EPRI Project/Program Agreements	Unlimited	<$500K	<$100K	<$25K
SCE Sponsored Hotel/Catering/Event Agreements/Contracts	Unlimited	<$500K	<$100K	<$25K

ENGINEERING & TECHNICAL SERVICES				
Description	**Bus Unit Sr. VP/ VP**	**Director**	**MGR3**	**MGR2**
Supplier Technical Qualification Letter				X
Applicant Financed and SCE Financed Added Facilities Agreements				X
Construction Project Storm Water Pollution Plan Permit Registration	X	X		X

[8] Signature authority for contracts and other instruments is delegated only to the specific employees named on Attachment 2.

APPENDIX H

CONTRACTORS AND SUBCONTRACTORS

CONTRACTORS AND SUBCONTRACTORS

Contractor/Subcontractor Name and Address	Contact Person/ Phone Number	Activity	Start Date	End Date
TBD				

APPENDIX I

TRAINING REPORTING FORM

Trained Contractor Personnel Log

Storm Water Management Training Log

Project Name: SCE – **Nipton Material Storage Yard**

Storm Water Management Topic: (check as appropriate)

- ❑ Erosion Control
- ❑ Sediment Control
- ❑ Wind Erosion Control
- ❑ Tracking Control
- ❑ Non-storm water management
- ❑ Waste Management and Materials Pollution Control
- ❑ Storm Water Sampling

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours):

Attendee Roster
(Attach additional forms if necessary)

Name	Company	Phone

COMMENTS:

Trained Contractor Personnel Log

(Insert any documentation of training here.)

Date	Training Type (ex. formal class, tailgate session, video)	Training Duration	Attendees

Note: Attach copies of sign-in sheets or other documentation of training (certificates, materials presented, agenda, etc.)

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Alan Batdorf

January 11, 2011 – January 11, 2013

Certificate # 00221

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

John Slayton

December 10, 2010 – December 10, 2012

Certificate # 00229

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

The CPESC® Application Review Committee
certifies that

Matthew M. Renaud

Subscribes to the Code of Conduct and Ethics and has met the requirements established by the CPESC Council as a

Certified Professional in Erosion and Sediment Control™

An EnviroCert International, Inc. Program

Certification Number: 6156

Certification Date: December 14, 2010

Donald W Fabe Jr.
Chair, CPESC Council

Gina Burleson
CPESC Program Manager

The CPESC Program was established in 1982.

The CESSWI™ Application Review Committee
certifies that

Michael William O'Hearn

Subscribes to the Code of Conduct and Ethics and has met the requirements established by the CESSWI Council as a

Certified Erosion, Sediment and Storm Water Inspector™

An EnviroCert International, Inc. Program

Certification Number: 1024

Certification Date: July 1, 2010

Susan A Cleveland
Chair, CESSWI Council

Glenda Caumnay
CESSWI Program Manager

The CESSWI Program was established in 2007.

APPENDIX J

MONITORING AND REPORTING PROGRAM RECORDS:

1. Construction Site Inspection Checklist
2. Stormwater Monitoring and Reporting Form
3. Visual Inspection Field Log Sheet
4. Pollutant Testing Guidance Table

SCE:

NIPTON MATERIAL STORAGE YARD FORMS

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Temporary Erosion Controls				
Does the applied erosion control provide 100% coverage for the required areas?				
Are there any non-vegetated areas that need erosion control?				
Is the area where erosion control is required free from visible erosion?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, or mulching?				
Are there any areas of the site that are disturbed, but will likely lie dormant for over 14 days?				
Do any erosion control BMPs require maintenance?				
Temporary Sediment Controls				
Are temporary sediment controls functional, maintained properly, and installed in accordance with the details and/or the SWPPP Map?				
If not, do any sediment control BMPs require maintenance?				
Are temporary sediment controls free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced according to the SWPPP Map?				
Are fiber rolls installed and maintained on required slopes in accordance with the details, functional and maintained?				
Are silt fences placed on level contours?				
Storm Drain Inlet Protection				
Are storm drain inlet BMPs internal to the project installed and maintained properly, according to the storm drain inlet BMP Fact Sheet located in the SWPPP report?				
Similarly, are offsite storm drain inlet BMPs installed and maintained properly?				
Stockpiles				
Are stockpiles covered and protected from run-on, run-off from adjacent areas, and from winds?				
Are stockpiles covered and located at least 50 feet from concentrated flows, downstream drainage courses and storm drain inlets?				
Have soil stockpiles that will sit for over 14 days been stabilized?				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Tracking Control				
Does the project have a stabilized construction site entrance/exit and is it installed correctly according to the SWPPP?				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed according to the SWPPP?				
Wind Erosion Control				
Is dust control implemented?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Dewatering Operations				
Is dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 50 feet away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Waste Management & Materials Pollution Control				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 50 feet from concentrated flows and downstream drainage facilities?				
Are material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and water tight?				
Do temporary concrete washout facilities prevent concrete residues from entering the drainage system?				
Are the temporary concrete washout facilities' liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters with lids?				
Are trash receptacles provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Are waste management receptacles free of leaks?				
Is the site free of litter?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Are portable toilets placed within containment to prevent the discharge (leaking) of pollutants?				
Spill Control and Response				
Are there proper spill clean-up materials, and posted spill-reporting procedures for hazardous materials and wastes in open and accessible locations adjacent to storage areas?				
If a spill has occurred, was the Environmental Specialist contacted within 24 hours of a spill of a hazardous substance?				
Non-Storm Water Discharges				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Environmental Specialist been notified?				
If there has been an unauthorized or non-storm water discharge, has it been immediately contained, cleaned up and documented in the SWPPP?				
Are there any other potential non-storm water pollution control concerns at the site?				
Discharge Points				
Are discharge points and discharge flows free from noticeable pollutants?				
Are discharge points free of any significant erosion and deposition?				
SWPPP Update				
Does the SWPPP adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown in the SWPPP Map also installed on the construction site?				
Is the SWPPP on-site where it is accessible to others?				
Is the NOI posted on-site?				
Does the SWPPP contain a current list of potential pollutant sources?				
General				
Was a Rain Even Action Plan (REAP) developed since the last inspection?				
Are there any other potential water pollution control concerns at the site?				
Storm Water Monitoring				
Is there a 50% chance of rain or greater in the forecast? (http://www.wrh.noaa.gov) Note: Print and attach NOAA forecast to this checklist.				
If this is a post-storm inspection, did the storm event produce precipitation of 0.5 inch or more?				
Are there any noticeable odors or visible sheen on the surface of any runoff or discharges?				

STORM WATER MONITORING AND REPORTING				
Parameter	**Date**	**Time**	**Location**	**Result**

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Risk Level 1
Visual Inspection Field Log Sheet

Date and Time of Inspection:				Report Date:		
Inspection Type:	□ Weekly	□ Before predicted rain	□ During rain event	□ Following qualifying rain event	□ Contained stormwater release	□ Quarterly non-stormwater

Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations

Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate storm beginning: _____ (date and time)	Estimate storm duration:_____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes identify location		
Odors	Yes □	No □
Floating material	Yes □	No □
Suspended Material	Yes □	No □
Sheen	Yes □	No □
Discolorations	Yes □	No □
Turbidity	Yes □	No □

Site Inspections

Outfalls or BMPs Evaluated	Deficiencies Noted
(see attached detailed **Construction Site Inspection Checklists**)	

Was water quality sampling part of this inspection?	❒ Yes	❒ No
If YES, see the results on the final page of the inspection form.		

Photos Taken:	Yes □	No □	Photo Reference IDs:

Corrective Actions identified to bring the site into compliance (note if SWPPP needs to be modified)

"I certify that this inspection form is true, accurate, and complete, to the best of my knowledge and belief."

Inspector Name:	Inspector Title:
Signature:	Date:

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Sampling Field Log Sheet for Non-Visible Pollutants

Construction Site Name:	Date:	Time Start:
Sampler:		
Sampling Event Type:	□ Non-visible pollutant □ Other_____	

Field Meter Calibration

pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements

Location Description	pH	Turbidity	Time

Grab Samples Collected

Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Asphalt Products	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes – Black, solid material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter Acidity Test Kit	EPA 150.1 (pH) SM 2310B (Acidity) EPA 300.0 (Anion)
	Bleaches	No	Residual Chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	Phosphate	Phosphate	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Portland Concrete Cement and Masonry Products	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	**pH**	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Alkalinity		SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	Methyl Methacrylate	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	Calcium Test	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter Alkalinity or Acidity Test Kit	SM 2310B (Acidity)
			Alkalinity		SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
			VOC/SVOC		EPA 601/602 or EPA 624 (VOC)/ EPA 625 (SVOC)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Landscaping and Other Products	Aluminum Sulfate	No	Aluminum	TDS Meter Sulfate	EPA 200.8 (Metal)
			TDS		EPA 160.1 (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	Sulfate	Sulfate	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic [4]	No	Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Phosphate	Phosphate	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	EPA 351.3 (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers-Organic	No	TOC	Nitrate	EPA 415.1 (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		EPA 351.3 (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required		
	Herbicide	No	Herbicide	None	Check lab for specific herbicide or pesticide
	Pesticide		**Pesticide**		
	Lime		Alkalinity	pH Meter Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Painting Products	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	COD	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	COD	None	EPA 410.4 (COD)
	Solvents	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable - No Testing Required		

Pollutant Testing Guidance Table [1]					
Category	**Construction Site Material**	**Visually Observable?**	**Pollutant Indicators [2]**	**Suggested Analyses Field [3]**	**Laboratory**
Contaminated Soil [5]	Aerially Deposited Lead[3]	No	Lead	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
	Other	No	Contaminant Specific	Contaminant Specific	Contaminant Specific
Line Flushing Products	Chlorinated Water	No	Total chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
Adhesives	Adhesives	No	COD	None	EPA 410.4 (COD)
			Phenols	Phenol	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)
Dust Palliative Products	Salts (Magnesium Chloride, Calcium Chloride, and Natural Brines)	No	Chloride	Chloride	EPA 300.0 (Chloride)
			TDS	TDS Meter	EPA 160.1 (TDS)
			Cations (Sodium, Magnesium, Calcium)	None	EPA 200.7 (Cations)
Vehicle	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid	Visually Observable - No Testing Required		
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
	Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Soil Amendment/ Stabilization Products	Polymer/Copolymer [6, 7]	No	Organic Nitrogen	None	EPA 351.3 (TKN)
			BOD	None	EPA 405.1 (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	EPA 415.1 (DOC)
			Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes - Solids	Visually Observable - No Testing Required		
	Lignin Sulfonate	No	Alkalinity	Alkalinity	SM 2320 (Alkalinity)
			TDS	TDS Meter	EPA 160.1 (TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
			Nickel		EPA 200.8 (Metal)
	Gypsum	No	pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Calcium	Calcium	EPA 200.7 (Calcium)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
			Manganese		
			Vanadium		

Pollutant Testing Guidance Table [1]					
Category	**Construction Site Material**	**Visually Observable?**	**Pollutant Indicators [2]**	**Suggested Analyses Field [3]**	**Laboratory**
Treated Wood Products	Ammoniacal-Copper-Zinc-Arsenate (ACZA) Copper-Chromium-Arsenic (CCA) Ammoniacal-Copper-Arsenate (ACA) Copper Naphthenate	No	Arsenic	Total Chromium	EPA 200.8 (Metal)
			Total Chromium		
			Copper		
			Zinc		
	Creosote	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		

Notes:

1. If specific pollutant is known, analyze only for that specific pollutant. See MSDS to verify.
2. For each construction material, test for one of the pollutant indicators. Bolded pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.ysi.com and www.chemetrics.com for some of the test kits
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the contract documents for aerially deposited lead (ADL)
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by the State of California Department of Transportation (Caltrans), the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is **not** required: Super Tak™, M-Binder™, Fish Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

Eldorado-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan
Ivanpah Material Storage Yard

SOUTHERN CALIFORNIA EDISON®

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STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
PER
CALIFORNIA 2009-0009-DWQ, Amended by 2010-0014 DWQ
FOR

ELDORADO-IVANPAH TRANSMISSION PROJECT
IVANPAH MATERIAL STORAGE YARD

North of Coloseum Rd
Ivanpah, CA 92364

Risk Level 1

Qualified SWPPP Developer (QSD)

AEI CASC CONSULTING

Melanie Sotelo, CPESC
Project Manager
18 Technology Drive, Suite 135
Irvine, CA 92618
(909) 783-0101 Ext. 1600

Date: August 9, 2011

Estimated Construction Dates:

Start Date: 09/01/2011 **Completion Date: 03/30/2012**

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- RISK ASSESSMENT
- SITE MAP (INCLUDING VICINITY MAP)
- WDID CONFIRMATION LETTER
- SIGNED CERTIFICATION STATEMENT

APPENDIX C — AMENDMENT LOG AND CHANGES TO PRDS

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- POLLUTANT TESTING GUIDANCE TABLE

SECTION 1
SWPPP REQUIREMENTS

1.1 Introduction

This SWPPP is written for a project with coverage under **STATE WATER RESOURCES CONTROL BOARD (SWRCB) ORDER NO. 2009-0009-DWQ as amended by 2010-0014-DWQ; GENERAL PERMIT NO. CAS000002** as a Risk Level 1 Project. (See risk assessment analysis in Appendix B.)

Southern California Edison (SCE) shall ensure that this SWPPP is developed and amended or revised by a QSD. This SWPPP is designed to address the following objectives:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled.
2. Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated.
3. Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard.
4. Calculations and design details as well as BMP controls for site run-on are complete and correct.
5. Stabilization BMPs installed to reduce or eliminate pollutants after construction is completed.

1.2 Certifications by Qualified SWPPP Developer

This SWPPP was developed by a Qualified SWPPP Developer (QSD):

AEI-CASC Consulting
Melanie Sotelo
18 Technology Drive, Suite 135
Irvine, CA 92618
(909) 783-0101 Ext. 1600
Qualifications*: CPESC No. 5693, QSD CASQA Registration No. 225

Date: August 9, 2011

QSD Signature: Melanie Sotelo

Print QSD Name: Melanie Sotelo

QSD Title: Project Manager

*Include Qualifications and documentation of training in Appendix I, or stamp cover sheet.

1.2.1 SWPPP Certification by a Legally Responsible Person (LRP)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date: 9/12/11

Contact Signature: Don Johnson

Owner Name: Don Johnson

Owner Title: Manager 3, TDBU Major Projects Organization

1.2.2 Permit Registration Documents (PRDs)

To obtain coverage under the General Permit, dischargers are required to electronically file PRDs which includes a Notice of Intent (NOI), Risk Assessment, Site Map, Storm Water Pollution Prevention Plan, and Signed Certification Statement. In addition to electronically filed PRDs, the appropriate Annual permit fees shall be mailed to the SWRCB.

PRDs have been submitted to the SWRCB via the Stormwater Multiple Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP). Refer to Appendix B for a copy of the Project PRDs and Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP Availability and Implementation

The General Permit (Section XIV.C) requires the SWPPP be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawings will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone. **The SWPPP shall be implemented concurrently with the start of ground disturbing activities.**

1.4 SWPPP Amendments

The General Permit (Section VII.B.6) requires that this SWPPP be modified and amended to reflect any changes in construction or operations that may affect the discharge of pollutants from the construction site to surface waters, ground waters, or the municipal separate storm sewer system (MS4). The SWPPP will also be amended if it is in violation of any condition of the Permit or has not achieved the general objective of reducing pollutants in storm water discharges. SWPPP Amendments will be prepared by a Qualified SWPPP Developer (QSD). The QSP shall notify the LRP or the QSD if an amendment to the SWPPP is required. SWPPP Amendments will be dated, signed by the QSD, and directly attached to the SWPPP. Refer to Appendix C, for the SWPPP Amendment Log and corresponding Amendment Documents.

1.5 Retention of Records

The General Permit (Sections I.J.69 and IV.G) requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed. SCE shall furnish the RWQCB, SWRCB, or US Environmental Protection Agency (EPA), within a reasonable time, any requested information to determine compliance with this General Permit. Records shall be retained for a minimum of three years for the following items:

- Site inspections
- Compliance certifications
- Discharge reports
- Approved SWPPP document and amendments

1.6 Required Non-Compliance Reporting

The General Permit (Section I.J.) identifies several areas of non-compliance reporting. It is the responsibility of SCE to properly document reportable discharges or other violations of the General

Permit. Exceedances and violations will be reported using the SMARTS system and include the following:

- Self-reporting of any other discharge violations or to comply with RWQCB enforcement actions; and
- Discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR §§ 117.3 and 302.4, and those defined by California regulation or statute, unless a separate NPDES Permit has been issued to regulate those discharges.

If an illegal discharge occurs or if the project receives a written notice or order from any regulatory agency, the QSP will immediately notify the TDBU E-SES and LRP, and will file a written report to the SCE-TDBU SWPPP Coordinator within 7 days of the discharge event, notice, or order, and the LRP will file compliance documentation as required per the General Permit, to the Regional Water Quality Control Board (RWQCB) via the SMARTS system. Corrective measures will be implemented immediately following the discharge, notice, or order. The report will contain the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge, including the cause or nature of the notice or order;
- The control measures (BMPs) deployed before the discharge event, or prior to receiving notice or order;
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence; and
- An implementation and maintenance schedule for any affected BMPs.

1.7 Annual Report

SCE is responsible for preparing, certifying, and electronically submitting an Annual Report for this Project if it remains under General Permit coverage for at least 3 months. The Annual Report shall be filed prior to submitting a Notice of Termination (NOT) for this Project, but no later than September but no later than September 1st, 2012 of each year. Reporting requirements are identified in Section XVI of the General Permit and include providing a summary of the following:

1. A summary and evaluation of all sampling and analysis results, including copies of laboratory reports.
2. The analytical method(s), method report unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").
3. A summary of all corrective actions taken during the compliance year.
4. Identification of any compliance activities or corrective actions that were not implemented.
5. A summary of all violations of the General Permit.
6. The names of individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements.
7. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including any required precipitation (rain gauge) recordings.

8. Documentation of all training for individuals responsible for all activities associated with compliance with this General Permit.
9. Documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair.
10. Documentation of all training for individuals responsible for overseeing, revising, and amending the SWPPP.

1.8 Changes to Permit Coverage

The General Permit (Section II.C) includes provisions allowing the revision of total acreage covered by the General Permit when a portion of the site is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the site is sold to a different entity; or when new acreage, subject to the General Permit, is added to the site.

Within 30 days of a reduction or increase in total disturbed acreage, SCE will electronically file revisions of PRDs that include a certified Change of Information (COI), revised site map, SWPPP revisions, as appropriate, and, if applicable, certification that new landowners have been notified of applicable requirements to obtain permit coverage (including name, address, phone number, and e-mail address of new landowner) in accordance with requirements of the General Permit. Refer to Appendix C for the SWPPP Amendment Log and PRD changes.

1.9 Notice of Termination

Prior to submitting a Notice of Termination (NOT) an annual report must be submitted (see Section 1.7). Within 90 days of when construction is complete or ownership has been transferred, SCE shall electronically file an NOT, a final site map, and photos via SMARTS, to terminate coverage under the General Permit. Construction is considered complete only when all portions of the site have been transferred to a new owner, or all of the following conditions are met:

- The site will not pose any additional sediment discharge risk than it did prior to construction activity;
- There is no potential for construction-related storm water pollutants to be discharged into site runoff;
- Final stabilization has been reached;
- Construction materials and wastes have been disposed of properly.

The NOT must demonstrate that the project meets all of the requirements of Section II.D.1 of the General Permit through one of the following:

- 70% final cover method as depicted by photos (no computational proof required);
- RUSLE or RUSLE 2 method, (computational proof required); or
- Custom method (discharger demonstrates that site complies with final stabilization in some other manner than shown above).

SECTION 2
PROJECT SITE INFORMATION

2.1 Project Overview

The Southern California Edison (SCE) Ivanpah Material Storage Yard (Project) is a component of an overall larger project: The Eldorado-Ivanpah Transmission Project (EITP), a Linear Underground/Overhead Project. This SWPPP describes the storm water best management practices to be implemented at the Ivanpah Material Storage Yard and is being developed separately because of diverse geographical areas, construction phasing, as well as different contractors associated with the EITP. The EITP traverses two states (California and Nevada) and the construction activities include transmission upgrades and associated transmission infrastructure submitted by SCE to the California Public Utilities Commission (CPUC) and the Bureau of Land Management (BLM). SCE proposes to construct, operate, and maintain new and upgraded transmission facilities to deliver electricity from several solar energy facilities proposed to be built in the Ivanpah Valley area. The upgraded transmission lines would extend approximately 35 miles from southern Clark County, Nevada, to northeastern San Bernardino County, California. Approximately 28 miles of the EITP are in Nevada, with the remaining 7 miles in California.

2.1.1 Project Site Activities

This Ivanpah Material Storage Yard is being developed to serve as a Project-permanent material storage area that will be utilized during construction activities associated with the western portion of the overall EITP. The Project is located within California, in the jurisdiction of Lahontan Regional Water Quality Control Board (6-South), San Bernardino County, north of Coloseum Road and west of Densmore Drive. The approximate location of the Project is the proposed location of the future Ivanpah Substation, latitude 35.546946° and longitude -115.470473°.

This yard will be used as a reporting location for workers, material storage, a potential helicopter staging area, and vehicle equipment parking. The main construction activities associated with this Project include rough grading/clearing operations, soil stabilizing with approximately 4-inch depth of ¾-inch gravel, and the possible installation of the following Project elements: temporary vehicle and equipment fueling areas; graveled helicopter pad and parking areas; 6-foot high chain-link fencing with privacy screening; construction trailer; restrooms; and generator lighting.

Upon completion of construction activities of the EITP, the Ivanpah Material Storage Yard will be removed and the site returned to pre-existing conditions or equivalent. Total disturbed area for this Project is estimated to be approximately 17 acres.

2.1.2 Vicinity Map

Refer to Appendix B for Project Vicinity Map.

2.2 Project Flows

Generally, the terrain is relatively flat with a slight easterly slope, and will remain unchanged by this Project. Existing flows move across the site in an easterly direction and ultimately discharge to Ivanpah Lake, an existing dry lake bed located easterly of the proposed Project. Ivanpah Lake is not listed on the 2010 303(d) list and has no established TMDLs. The Project is not located in an environmentally sensitive area.

2.2.1 Storm Water Run-On from Offsite Areas

During construction activities, flows will be either intercepted and/or redirected around active construction areas and then allowed to continue along their existing path of travel. BMPs selected to control run-on from discharging sediment on the construction site are described in Section 3.5.2.

2.3 Project Risk Assessment

A project's risk assessment is dependent on the project's location in proximity to receiving waters, impairments of the receiving waters, the timeline for construction activities, and site characteristics. Project risk level is determined from the following:

- Sediment Risk – the relative amount of sediment that can be discharged, given the above mentioned factors.
- Receiving Waters Risk – the risk that sediment discharges pose to a project's receiving waters.

See table 2-1 for the Project's sediment risk assessment and Table 2-2 for the Project's receiving waters risk assessment.

Table 2-1
Risk Assessment

Summary of Sediment Risk		
RUSLE Factor	**Value**	**Method for establishing value**
R	6.57	EPA NPDES Rainfall Erosivity Factor Calculator
K	0.32	SWRCB Map/tools
LS	2.76	SWRCB Map/tools
Total Predicted Sediment Loss (tons/acre)		5.78
Overall Sediment Risk: – Low Sediment Risk < 15 tons/ acre – Medium Sediment Risk >= 15 and < 75 tons/acre – High Sediment Risk >= 75 tons/acre		☒ Low ☐ Medium ☐ High

Summary of Receiving Water Risk			
Receiving Water Name:	**303(d) Listed for Sediment Related Pollutant[1]**	**TMDL for Sediment Related Pollutant[1]**	**Beneficial Uses of COLD, SPAWN, and MIGRATORY[1]**
Ivanpah Lake	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
Overall Receiving Water Risk			☒ Low ☐ High

(1) If yes is selected for any option the Receiving Water Risk is High

Table 2-2
Risk Level Determination

Combined Risk Level Matrix		Sediment Risk		
		☒Low	☐Medium	☐High
Receiving Water Risk	☒Low	Level 1	Level 2	
	☐High	Level 2		Level 3

Based on the low sediment risk level assessment and the low receiving waters risk assessment, the Project is determined to be a Risk Level 1 project as shown in Table 2-2 above. A copy of the Risk Level determination documents (PRDs submitted to SMARTS) is included in Appendix B.

2.4 Construction Schedule

A project schedule has been developed and is provided below. BMP deployment will begin concurrently with ground disturbance activities. The schedule includes the following:

- Estimated Project Start Date: 9/01/11
- Estimated Yard Ready to Receive Materials: 12/21/11
- Estimated Project Completion Date: 03/30/12

2.5 Potential Construction Site Pollutant Sources

SCE will utilize the control practices identified for each activity that are identified in Section 3 and on the Site Map to minimize or eliminate potential pollutants from discharging from the construction site. The following sections identify potential pollutant sources associated with the Project.

Appendix F includes a copy of the fact sheets of all the BMP's selected for this Project. Implementation and location of BMPs are shown on the Site Map in Appendix B. Narrative descriptions of BMPs which will be used during the overall Project are listed by category in Section 3 of this SWPPP.

2.5.1 Construction Materials

The following is a list of construction materials that may be used which may have the potential to contribute to pollutants in storm water discharges:

- Vehicle fluids, including oil, grease, petroleum, and coolants
- Cement materials associated with concrete operations for fencing installation
- Base and sub base material (may include electrical wiring)
- Concrete curing compounds
- BMP materials
- Treated lumber (materials and waste)
- PCC rubble

- General litter
- Wood products
- Metals and plated products
- Fertilizer, herbicides and pesticides (if necessary)

2.5.2 Construction Wastes

The following is a list of solid or construction wastes that may be created which may have the potential to contribute to pollutants in storm water discharges:

- Solid waste generated from removal of trees and shrubs
- Packaging materials including wood, paper and plastic
- Scrap metals
- Plastic
- Food wastes
- Timber
- Steel
- Electrical cuttings
- Non-hazardous equipment parts
- Styrofoam
- Hazardous wastes
- Concrete wastes

2.5.3 Construction Activities

The following is a list of construction activities that may be performed which may have the potential to contribute to sediment in storm water discharges:

- Rough grading/clearing operations
- Post hole auguring and fence installation
- Stockpiling (if necessary)
- Gravel installation
- Vehicle and equipment maintenance

2.5.4 Other Pollutants Sources

Table 2-3
Construction Activity and Associated Pollutants

Activity Type		Pollutant	Visually Observable
Soil Disturbance:			
☒	Rough grading/Clearing	Sediment and organics	Cloudy to opaque
☒	Base Material installation	Sediment	Cloudy to opaque
☐	Fine Grading	Sediment	Cloudy to opaque
☒	Trenching (post hole auguring)	Sediment	Cloudy to opaque
☒	Stockpiling (if necessary)	Sediment	Cloudy to opaque
Asphalt:			
☐	Street Construction	Hydrocarbons	Oily sheen
☐	Street Improvements	Hydrocarbons	Oily sheen
☐	Street Demolition	Hydrocarbons	Oily sheen
Concrete Laden Liquid:			
☐	Curb & Gutter	pH	Cloudy to milky
☐	Sidewalks	pH	Cloudy to milky
☒	Foundations/post installations	pH	Cloudy to milky
☐	Driveways	pH	Cloudy to milky
☐	Medians	pH	Cloudy to milky
☐	Stuccoing	pH	Cloudy to milky
☐	Grouting	pH	Cloudy to milky
☒	Washouts/Clean up	pH	Cloudy to milky
General:			
☐	Framing	Sawdust	Yes
☐	Painting	Paint (when wet)	Yes
☐	Dry Walling	Gypsum/Joint Compound	Yes
☐	Tiling	Ceramic dust	Yes
☐	Cabinet Building/Installing	Sawdust	Yes
☐	Plumbing	PVC Glue (when wet)/Plastic	Yes
☒	Wiring/Electrical Utilities	Copper/Plastic/Metals	Yes
☐	Heating/Air Conditioning	Sheet metal/fiberglass wool	Yes
☐	Landscaping	Containers/mulch/soil	Yes

Table 2-4
Equipment used During Construction

Equipment Type			
☒	Backhoe loader(s)	☒	Fork & Rough-terrain lifts (Pettibone)
☒	Water truck(s)	☒	Generator(s)
☐	Scraper(s)	☐	Concrete boom pumps
☒	Loader(s)	☐	Concrete pumps
☒	Bulldozer(s)	☐	Asphalt planer / grinder
☐	Motor-grader	☐	Asphalt paving machine
☐	Excavator(s) / Track hoe(s)	☐	Street striping equipment
☐	Dump trucks (10-wheel)	☒	Building material delivery trucks
☒	Belly/Bottom dumps (tractor/trailer)	☒	Personal cars and light trucks
☐	Tractor: skip loader	☒	Waste hauling trucks
☐	Skid steer loaders (Bobcat)	☐	Trencher(s)
☐	Concrete delivery trucks	☐	Stucco/Plaster spray pumps
☒	Portable concrete mixers	☐	Spray paint equipment (airless)
☒	Compaction equipment	☐	Other

Table 2-5
Potential Construction Site Pollutants

Yes	Material Type	Pollutant	Visually Observable	Typical Location
☒	Diesel Fuel	Petroleum distillates, naphthalene, xylene	Sheen/Stain	Material storage area
☒	Gasoline	Benzene, toluene, xylene, MTBE	Sheen/Stain	Material storage area
☒	Hydraulic Oil	Mineral oil, trace additives	Sheen/Stain	Material storage area
☒	Engine Oil	Mineral oil, additives, combustion byproducts	Sheen/Stain	Material storage area
☒	Transmission Oil	Mineral oil, trace additives	Sheen/Stain	Material storage area
☒	Engine Coolant	Ethylene and propylene glycol, heavy metals	Green/red	Material storage area
☒	Grease	Petroleum hydrocarbons	Sheen/Stain	Material storage area
☐	Kerosene	Petroleum hydrocarbons	Sheen/Stain	Material storage area
☐	Fertilizer	Nitrogen, phosphorus	No	Material storage area
☒	Pesticide	Water-insoluble chlorinated hydrocarbons, organophosphates, carbonates, and pyrethrums.	Varies	Material storage area
☒	Herbicide	Chlorinated hydrocarbons, organophosphates	Varies	Material storage area
☐	Soil Amendments		No	Material storage area
☒	Concrete (wet)	Fly ash, heavy metals, Portland cement	White solid	Streets & building pads
☐	Concrete coring slurry	Turbidity and pH	Gray liquid	Building construction & streets
☐	Concrete sawing slurry	Turbidity and pH	Gray liquid	Building construction & streets
☒	Cement	Aluminum calcium iron oxide, calcium sulfate	Gray powder	Material storage area
☐	Drywall joint compound	Pigment, vinyl acetate	White putty	Building construction
☐	Grout	Silica sand, Portland cement	White powder	Block wall & Building construction
☐	Paint	Ethylene glycol, titanium oxide, VOC	Colored liquid	Building construction
☐	Sealers	Diacetone alcohol,		Building construction & Streets
☐	Adhesives	COD/ Phenols/ SVOC	White/yellow	Building construction
☒	Sanitary waste	Human waste	Yes	Staging areas & all construction areas
☒		Animal waste	Yes	All areas
☐	Asphalt	Asphalt fumes, cutback asphalt,	Black material	Streets

Yes	Material Type	Pollutant	Visually Observable	Typical Location
☒	Curing Compounds	Glass Oxide, urea-extended phenol	Creamy white	Material storage area
☒	Waste wash water	Residuals and modifications to pH	Suds, foam, froth	Material storage area
☐	Wood Preservatives	Arsenic, Chromium (Total), Copper, and Zinc	Amber liquid	Building construction
☒	Cleaning Solvents	Perchloroethylene, methylene chloride, TCE	Varies	Material storage area
☒	Sediment	Soil, turbidity, dust	Muddy	Material storage area
☒	Vegetation	Organic matter	Yes	Material storage area
☒	Solid Waste	Floatable and blowable trash and debris	Yes	Material storage area
☐	Tile			Building construction & material storage areas
☐	Historic land use contaminants (if applicable)			

2.6 Identification of Non-Storm Water Discharges

Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, and other discharges not subject to a separate NPDES permit adopted by a Regional Water Board. The discharge of non-storm water is authorized under the following conditions:

1. The discharge does not cause or contribute to a violation of any water quality standard;
2. The discharge does not violate any other provision of the General Permit;
3. The discharge is not prohibited by the applicable Basin Plan;
4. SCE has included and implemented specific BMPs required by this General Permit to prevent or reduce the contact of the non-storm water discharge with construction materials and equipment;
5. The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities or pollutants;
6. SCE reports the sampling information in the Annual Report.

Authorized non-storm water discharges associated with this Project may include the following de-chlorinated sources:

- Water to control dust (obtained from Molycorp)

Refer to Section 3.3 for a description of BMPs selected to address non-storm water discharges.

SECTION 3
BEST MANAGEMENT PRACTICES

3.1 Schedule for BMP Implementation Specific for this Project

Table 3-1
BMP Implementation Schedule

BMP Description	Estimated Timeline of Activity Estimated Project Start Date: 09/01/11 Estimated Project Completion Date: 03/30/12	
EC-1 Scheduling	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
EC-2 Preservation Of Existing Vegetation	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-1 Material Delivery and Storage	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-2 Material Use	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-3 Stockpile Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-4 Spill Prevention and Control	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-5 Solid Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-6 Hazardous Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-8 Concrete Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
WM-9 Sanitary/Septic Waste Management	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization
NS-1 Water Conservation Practices	☒ Grading and Land Development ☐ Vertical Construction	☐ Streets and Utilities ☒ Final Landscaping and Site Stabilization

Table 3-1
BMP Implementation Schedule

BMP Description	Estimated Timeline of Activity Estimated Project Start Date: 09/01/11 Estimated Project Completion Date: 03/30/12
NS-6 Illicit Connection/Discharge	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-7 Potable Water/Irrigation	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-9 Vehicle and Equipment Fueling	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-10 Vehicle and Equipment Maintenance	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-12 Concrete Curing	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-13 Concrete Finishing	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-1 Silt Fence	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-5 Fiber Rolls	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-6 Gravel Bag Berm	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-7 Street Sweeping and Vacuuming	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
TC-1 Stabilized Construction Entrance/Exit	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
TC-2 Stabilized Construction Roadway	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WE-1 Wind Erosion Control	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization

Copies of BMP fact sheets specific to this project are located in Appendix F. The following good housekeeping measures should be implemented onsite for the duration of the project:

1. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).
2. Cover and berm loose stockpiled construction materials that are not actively being used.
3. Store chemicals in water tight containers (with appropriate secondary containment to prevent any spillage and leakage in a completely enclosed storage shed. Implement WM-2.
4. Minimize exposure of construction materials to precipitation.
5. Implement BMPs to prevent of-site tracking of loose construction and landscape materials.
6. Prevent the disposal of rinse or wash waters or materials on impervious site surfaces or into the storm drain.
7. Ensure the containment of sanitary facilities to prevent discharges of pollutants to the storm water drainage system or receiving water.
8. Regularly inspect sanitation facilities and clean or replace them as needed.
9. Cover waste disposal containers at the end of every business day and during rain events.
10. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.
11. Contain and securely protect stockpiled waste materials from wind and rain at all times unless actively being used.
12. Implement procedures to effectively address hazardous and non hazardous spills.
13. Maintain equipment and materials for clean-up of spills on-site. Contain leaks and clean up spills immediately. Properly dispose of all spilled materials.
14. Contain all washouts so that there is no discharge into the underlying soil and onto the surrounding areas.
15. Prevent oil, grease, or fuel from leaking in to the ground storm drains or surface waters.
16. Immediately clean up all leaked material and dispose of properly.
17. Contain stockpiled materials including mulches and topsoil when they are not actively being used.
18. Contain fertilizers and other landscape materials when they are not being actively used.
19. Discontinue the application of any erodible landscape material within two days before a forecasted rain event of during periods of precipitations.
20. Apply erodible landscape materials at quantities and application rates according to manufacturers recommendations based on written specifications by knowledgeable and experienced field personnel.
21. Stack erodible landscape materials on pallets and cover when not being used or applied.

22. Implement measures to control all non storm water discharges during construction.
23. Limit washing vehicles on-site to emergency situations only. Prevent non-storm water discharges from vehicle washing from reaching surface waters or the MS4 drainage system.
24. Prevent un-authorized non-storm water discharges from reaching surface waters or the MS4 drainage system when cleaning streets.
25. Implement effective wind erosion control BMPs.
26. Provide soil cover for areas of construction that have been disturbed and are not scheduled to be re-disturbed for at least 14 days and for all finished slopes, open space, utility backfill, and completed lots.
27. Limit the use of plastic materials when more sustainable environmentally friendly alternatives exist.
28. Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to control erosion and sediment discharges from the site.
29. Conduct regular storm water tailgate meetings with the workforce when the project is staffed and work is underway.

3.2 Housekeeping

3.2.1 Construction Materials

An inventory of construction materials and activities is provided in Sections 2.5.1 and 2.5.3, respectively. Implementation and locations of some materials handling control BMPs are shown on the Site Map(s) in Appendix B. The BMPs that have been selected to handle material controls on the construction site areas are:

- **WM-1 – Material Delivery and Storage and WM-2 Material Use**

  The material delivery, storage and usage area will be located within the Project site area as shown on the Site Map in Appendix A. In the event this area is relocated or additional areas are added, the QSP, or designated personnel, shall update the Site Map to show respective locations.

  SCE will utilize stabilized areas, as necessary, to prevent potential spills and unnecessary tracking of sediment. Vehicles, including field buggies, shall be stored in proper designated vehicle storage areas to prevent discharges of vehicle fluids (also see NS-10). Chemicals will be stored in watertight containers equipped with secondary containment or stored inside a storage shed. Spill clean-up materials, material safety data sheets, material inventory, and emergency contact numbers will be maintained and stored onsite by SCE.

- **WM-3 – Stockpile Management**

  Stockpiles during construction of this Project are not anticipated, however, if stockpiling does become necessary, SCE will update the Site Map to show their respective locations. Stockpile management should consist of the following:

  - Stockpiles should be located away from concentrated flows of storm water and drainage courses.
  - Stockpiles require proper wind erosion control. See WE-1-Wind Erosion Control for specifics of this BMP.

- All stockpiles shall be covered or protected with perimeter sediment control prior to the onset of precipitation.

3.2.2 Waste Management Controls

An inventory of construction wastes is provided in Section 2.5.2. Implementation and field locations of waste management control BMPs shall be shown on the Site Map(s) in Appendix B. The BMPs that have been selected to handle materials and control construction wastes are:

- **WM-5 – Solid Waste Management**

  SCE shall implement this BMP whenever wastes are generated, stockpiled, or removed from the Project. Due to potential windy conditions occurring often at the Project site, trash should be collected daily, at a minimum, and placed in waste containers equipped with functional lids, and covered at the end of every business day and during rain events. Implementation of this BMP will minimize storm water contact with waste materials and prevent waste discharges. Solid waste, including rubble stockpiles, should be removed and disposed of weekly at an authorized offsite facility.

- **WM-6 – Hazardous Waste Management**

  SCE shall implement this BMP to prevent or reduce the discharge of hazardous materials to stormwater or watercourses. SCE shall place hazardous materials in a non-permeable, waterproof spill containment bin and provide training of employees and subcontractors.

- **WM-8 – Concrete Waste Management**

  Temporary concrete washout facilities will be placed within the Project area and shown on the Site Map. They will be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations and placed a minimum of 50 feet from existing water courses, and apart from construction traffic areas. A sign shall be installed adjacent to the washout facility to inform concrete equipment operators to utilize the proper facilities.

- **WM-9 – Sanitary/Septic Waste Management**

  SCE shall minimize or eliminate the discharge of construction sanitary/septic wastes. This BMP is applicable to temporary and portable sanitary/septic systems on construction sites and associated areas. Portable toilets will be placed within the Project area as shown on the Site Map. Should locations change, or if additional portable toilets are necessary, the QSP, or designated personnel, shall update the Site Map. Weekly maintenance shall be provided and wastes will be properly disposed of at appropriate offsite facilities. The toilets will be located away from concentrated flow paths and traffic flow.

3.2.3 Vehicle Storage and Maintenance Controls

An inventory of construction activities is provided in Section 2.5.3. Implementation and locations of vehicle storage and maintenance control BMPs will be field located and the Site Map updated to show their respective locations. The BMPs that have been selected to handle vehicle storage and maintenance for the Project are:

- **NS-9 – Vehicle and Equipment Fueling**

  This BMP will be utilized to manage onsite fueling activities. Two temporary fueling areas will be constructed within the Project area as shown on the Site Map. Fuel trucks, each equipped with absorbent spill clean-up materials, will be used for all onsite fueling, whether at the temporary

fueling area or for mobile fueling elsewhere on the site. All mobile fueling operations will be conducted at least 50 ft away from operational inlets and drainage facilities and on a level graded area. Drip pans will be used for all mobile fueling.

- **NS-10 – Vehicle and Equipment Maintenance**

  Several types of vehicles and equipment will be used throughout the Project, including trucks and trailers, backhoes, forklifts and generators. This BMP will be utilized to prevent discharges of vehicle fluids during maintenance activities.

  All vehicle maintenance will be conducted at least 50 ft away drainage courses and on a level graded area. SCE will place drip pans, plastic sheeting, or absorbent material under vehicles and equipment while parked overnight, in storage, and when requiring maintenance activities that involve grease, oil, solvents, or other vehicle fluids.

  Construction vehicles and equipment will be serviced and stored onsite in the area as shown on the Site Map. If this area requires change due to construction phasing, the QSP, or designated personnel, shall update the Site Map to show its new location.

3.2.4 Landscape Materials

No landscape materials are intended for use in construction of this Project. However, the Project will utilize gravel base to provide final stabilization for the Project.

3.3 Non-Storm Water Management

3.3.1 Non-Storm Water Controls

An inventory of construction activities and potential non-storm water discharges is provided in Sections 2.5.3 and 2.6. Implementation and locations of some non-storm water control BMPs are shown on the Site Map(s) in Appendix B. The BMPs that have been selected to control non-storm water pollution for the Project are:

- **NS-1 – Water Conservation Practices**

  SCE shall use water in a manner, which will not cause erosion or transport pollutants off-site. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

- **NS-6 – Illicit Connection/Discharge**

  SCE shall use this BMP on all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

- **NS-7 – Potable Water/Irrigation**

  SCE shall implement this BMP whenever potable water or irrigation water discharges occur at, or enter a construction site.

- **NS-12 – Concrete Curing**

  Discharges of stormwater and non-stormwater exposed to concrete curing may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-12, to reduce or eliminate the contamination of stormwater runoff during concrete curing operations.

- **NS-13 – Concrete Finishing**

  Discharges of stormwater and non-stormwater exposed to finishing operations may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-13, to reduce or eliminate the contamination of stormwater runoff during concrete finishing operations.

3.3.2 Vehicle and Equipment Cleaning

Vehicle and equipment cleaning operations are not planned on this Project.

3.3.3 Spill Response

SCE shall implement WM-4, Spill Prevention and Control, and the following measures to address hazardous and non-hazardous spills at the Project site:

- Maintain equipment and spill clean-up materials available on-site, including, but not limited to shovels, brooms, spill absorbent, rags, and proper waste containment (i.e. non-permeable, water proof spill containment bin). Waste materials shall be labeled and disposed of properly in accordance with local, state, and federal requirements.
- Maintain Project-specific material safety data sheets, material inventory, and emergency contact numbers on-site.
- In the event of a leak or spill of hazardous substances used, stored, or generated on-site, implement proper spill clean up procedures to prevent pollutant discharges to storm drain systems. Spills of oil, petroleum products, and substances listed under 40 CFR parts 11, 117, and 302, and sanitary and septic wastes shall be contained and cleaned up immediately.

Also, refer to Attachment F for related BMP guidance factsheets:

- WM-4 – Spill Prevention and Control
- WM-5 – Solid Waste Management
- WM-6 – Hazardous Waste Management
- WM-9 – Sanitary/Septic Waste Management

Note: For this Project, **Patriot Environmental** has been identified, by SCE, as the primary spill clean-up responder, as well as for other waste discharge incidents.

The notification process will be from the person or entity causing or discovering the incident to the SCE–TDBU SWPPP Coordinator, John Slayton, then to the on-call TDBU E-SES (via the SCE operator) and finally to Patriot Environmental. There is always the possibility that Patriot Environmental may get a call directly from any of the preceding, and Patriot Environmental has been requested to take the call, and then to confirm with the on-call E-SES the person making the notification to them.

- John Slayton's Cell Phone Number: 310-990-1745
- TDBU E-SES Contact Number: 626-302-1212 (Ask for On-Duty TDBU Environmental Specialist)
- Patriot Environmental: 800-624-9136 (Dispatch 24 hr. Contact)

3.4 Erosion Controls

Erosion control consists of source control measures that are designed to prevent soil particles from detaching and becoming suspended in storm water runoff. This Project will incorporate, at a minimum,

temporary erosion control measures required by the General Permit, and other measures selected by SCE.

- **EC-1 – Scheduling**

  SCE shall reduce the discharge of pollutants to storm drain facilities or water courses caused by construction activities by scheduling activities in a manner that will limit exposure of disturbed soil to wind, rain, and storm water run-on and runoff. The Project schedule will sequence construction activities with the installation gravel for final stabilization.

- **EC-2 – Preservation of Existing Vegetation**

  SCE shall protect and preserve existing vegetation within the Project area as long as practicable before removing. SCE shall preserve and protect existing vegetation adjacent to all work areas. The protection and preservation of such vegetation will serve to control erosion and filter out sediment.

Implementation and locations of temporary erosion control BMPs are shown on the Site Map(s) in Appendix B and described in this section. The BMPs that will be implemented to control erosion for this Project are:

3.4.1 Wind Erosion Controls

This Project is located in an area common to high wind velocities. At a minimum, the Project shall implement screening of fencing and the following BMP to control dust for this Project:

- **WE-1 – Wind Erosion Control**

  This BMP, along with NS-1 – Water Conservation Practices, will be implemented to provide Dust Control and prevent discharges from dust control activities and water supply equipment. Water will be applied to disturbed soil areas of the Project to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Water equipment leaks will be repaired immediately. Water application rates will be minimized, as necessary, to prevent runoff and ponding.

3.4.2 Inactive Areas and Finished Slopes

The Project area is relatively flat and does not include any slopes requiring protection. Construction activities will be scheduled such that any disturbed areas will undergo construction until final stabilization is complete. For this Project, ¾-inch gravel base at a depth of 4-inches will be used for final stabilization.

3.5 Sediment Controls

Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This Project will incorporate at a minimum, temporary sediment control measures, and other measures selected by SCE.

Implementation and locations of temporary sediment control BMPs are shown on the Site Map in Appendix B. The BMPs that will be implemented to control sediment for the Project are detailed below.

3.5.1 Linear Barriers/Perimeter Controls

Linear barriers for perimeter protection will be applied throughout the Project. The installation of linear barriers will serve as sediment control for exposed soil areas. Linear barriers shall be maintained to provide adequate sediment holding capacity. Linear barriers will be placed across construction phase

perimeters. These linear barriers will be placed to prevent sheet flow from running uninterrupted into areas of the Project under active construction. As construction progresses and these Linear Barrier/Perimeter Control BMPs are implemented, altered, removed, and/or no longer required, the Site Map in Appendix B shall be updated.

The following BMPs have been selected to control sediment from discharging from the perimeter of active construction areas, ingress and egress locations, and into natural drainage systems outside of the construction area:

- **SE-1 – Silt Fence**

  Due to high winds commonly experienced in the Project area, use of silt fence may not be suitable in most areas. If it is determined to be necessary, proper installation for this BMP is crucial to withstand wind forces that it may encounter. These barriers may be placed according to SE-1 to prevent sheet flow from running uninterrupted into the Project construction area. Sediment shall be removed when it reaches approximately 1/3 of the barrier height. Barriers shall be removed from the site when no longer required.

- **SE-5 – Fiber Rolls**

  Fiber rolls may be placed around the Project perimeter, down-slope of exposed soil areas, and around temporary stockpiles. SCE shall place fiber rolls, as designated on the Site Map, in locations to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from runoff.

  Fiber roll barriers shall be secured (staked) to the ground in a trench depth of 1/4 to 1/3 of the thickness of the roll, and a width of the diameter of the roll. The area behind the fiber rolls will collect and hold runoff in order to allow suspended sediment to settle out. SCE will remove this sediment periodically, and especially after heavy rains. Fiber rolls, which become clogged with sediment, will be replaced as necessary to ensure the free flow of water.

- **SE-6 – Gravel Bag Berm**

  Gravel bag berms may be placed temporary stockpiles or the site perimeter. These barriers will be used to prevent sheet flow from running uninterrupted into existing drainage systems and to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from runoff.

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- **TC-1 – Stabilized Construction Entrance/Exit**

  This Project is located in an area where construction traffic will exit onto existing dirt roads, and the use of a stabilized construction entrance/exit may not be suitable. At a minimum, SCE construction crews shall implement SE-7 at all locations where SCE construction vehicles meet existing ac pavement roadways to control tracking of sediment from the Project area. If it is determined by the QSP, or designated personnel, that a stabilized construction entrance/exit is necessary, proper installation and maintenance shall be per TC-1 and the location shown on the Site Map in Appendix B.

  Construction entrances are stabilized to reduce tracking of sediment as a result of construction traffic. The designated entrances/exits will be graded to prevent runoff from leaving the construction areas. Stabilization material will be 3 to 6-inch aggregate. The entrances will be

flared if placed where it meets an existing road to provide an adequate turning radius. SCE shall limit speed of vehicles to control dust.

- **TC-2 – Stabilized Construction Roadway**

  The location of the Project may require the construction of access roadways which will be stabilized immediately after grading to prevent erosion and to control tracking of mud and soil material onto existing ac pavement roadways. All constructed access roadways will be clearly marked for limited speed to control dust. Chemical stabilizers or water will be used to control dust. Stabilization material may also consist of 6-inch aggregate base. If access roadways are constructed, the QSP, or designated personnel shall ensure proper installation and maintenance shall be per TC-2 and the location shown on the Site Map in Appendix B.

- **SE-7 – Sediment Sweeping and Vacuuming**

  SCE will implement sweeping and vacuuming, as necessary to control sediment that is tracked from the Project construction areas onto public roads. This will limit the amount of sediment that may be transported to storm drains or watercourses. Areas requiring implementation of the BMP shall be as shown on the Site Map in Appendix B.

3.5.2 Run-on – Run-off Controls

The following BMP has been selected to control sediment discharge from any potential run-on and runoff flows entering or leaving the construction site:

- **SE-6 – Gravel Bag Berm**

  This barrier may be used in conjunction with SE-5 (fiber rolls) to prevent run-on, run-off from running uninterrupted into the construction area to reduce flow velocities and release the runoff as sheet flow, providing removal of sediment from runoff.

3.6 Post-Construction Stormwater Management Measures

This Project is located in San Bernardino County and is not subject to standards of an active Phase I or Phase II Municipal Separate Storm Sewer System (MS4) Permit. This Project would be subject to any runoff reduction requirements of the CGP. However, these requirements do not take effect until September 2, 2012 and, therefore, are not required to be implemented for this Project.

SECTION 4
BMP INSPECTION,AND MAINTENANCE

4.1 BMP Inspection and Maintenance

All inspection, maintenance, repair, and sampling activities shall be performed or supervised by a Qualified SWPPP Practitioner (QSP). Refer to Section 6.1.2 for QSP contact information. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment. Site personnel who have received training on SWPPP implementation, BMP inspection and maintenance, and record keeping will be documented on a training log maintained in Appendix I.

4.1.1 Visual Inspections

Inspections for this Project shall be performed as follows:

- Weekly (Baseline)
- Quarterly
- Rain Inspections:
    - Pre-Rain Event
    - During (24-Hour) Rain Event
    - Post-Rain Event
- Stored or Contained Storm Water Discharge

The purpose of these inspections is to determine if implemented BMPs need maintenance, have failed, or could fail to operate as intended. If deficiencies are identified during BMP inspections, repairs or design changes shall be initiated within 72 hours of identification.

All Inspections shall be documented on the Site Inspection Checklist, provided in Appendix J, and shall remain onsite with the SWPPP at all times.

4.1.2 Qualifying Rain Event Inspections

The QSP shall visually inspect the construction site within two days prior to a predicted qualifying rain event, and within two days after a qualifying rain event. These inspections are only required within normal business hours of the construction site.

According to the General Permit, a qualifying rain event produces ½ inch or more of precipitation within a 48 hour or greater period between events. Weather forecast information shall be obtained from only the National Oceanographic Atmospheric Administration (NOAA) at the following website: http://www.srh.noaa.gov/.

The QSP will record the storm information for all qualifying rain events including the date, place, time of facility inspections, sampling, visual observation (inspections) notes, and/or measurements, including precipitation. Inspections shall be documented on the Visual Inspection Field Log, provided in Appendix J, and shall remain on-site with the SWPPP at all times.

4.1.3 Stored or Contained Storm Water Monitoring Locations

The QSP shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours. Inspections will be documented using the Visual Inspection Field Log, provided in Appendix J, and maintained onsite with the SWPPP.

4.1.4 Quarterly Non-Stormwater Discharge Inspections

Non-stormwater discharge inspections will be conducted at each drainage area per quarter at the construction site during normal daylight business hours within the following periods:

- January – March,
- April – June,
- July – September, and
- October – December.

Quarterly inspections will be documented using the Visual Inspection Field Log, provided in Appendix J, and maintained on-site with the SWPPP.

4.1.5 Maintenance and Repair

The QSP and/or delegated personnel shall begin implementing repairs or design changes to BMPs within 72 hours of identification of BMPs that:

- Need maintenance to operate effectively;
- Have failed; or
- Could fail to operate as intended.

If the problem warrants an amendment (e.g. a new procedure or BMP that needs to be implemented), the QSP, or designated personnel shall notify the QSD.

SECTION 5
TRAINING

5.1 Training

Personnel at the site shall receive training appropriate for individual roles and responsibilities on the Project. Appropriate personnel shall receive training on SWPPP implementation, BMP inspection and maintenance, and record keeping.

The training log showing formal and informal training of various personnel is provided in Appendix I. This form shall be used by the SCE QSP to document informal training of onsite personnel, including subcontractor's supervisors, project foremen, laborers, or other staff members.

SECTION 6
RESPONSIBLE PARTIES AND OPERATORS

6.1 Responsible Parties

The following sections provide a description of authorized representatives that have been approved by the LRP to be responsible for SWPPP activities and have been granted authority to sign permit related documents. Refer to Appendix G – Responsible Parties, for a copy of written authorizations.

6.1.1 Qualified SWPPP Developer (QSD)

The SWPPP shall be written, amended, and certified by a Qualified SWPPP Developer. The QSD shall meet the qualifications as specified by section VII.B.1 of the General Permit. Refer to Appendix A for the General Permit.

The Qualified SWPPP Developer that prepared this SWPPP was:

AEI-CASC Consulting
Melanie Sotelo, CPESC No. 5693
Project Manager
QSD/P CASQA Registration No. 225
(909) 783-0101 Ext. 1600

6.1.2 Qualified SWPPP Practitioner (QSP)

The General Permit requires that the personnel assigned to conduct inspections and monitoring is knowledgeable in the principles and practice of erosion and sediment controls. Assigned personnel shall possess the skills to assess the effectiveness of measures selected to control the quality of storm water discharges from the construction activity.

The Qualified SWPPP Practitioner assigned to the Project is:

John Slayton
CHMM REM CPEA
CPESC No. 5955., QSD/P CASQA Registration No. 229
SCE TDBU SWPPP Coordinator
Southern California Edison
(310) 990-1745

The QSP is responsible for non-storm water and storm water visual observations, sampling and analysis, and responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges. The QSP will be available at all times throughout the duration of the Project. Duties of QSP include but are not limited to:

- Ensuring full compliance with the SWPPP and the Permit
- Implementing all elements of the SWPPP, including but not limited to:
    - Implementation of prompt and effective erosion and sediment control measures
    - Implementing all non-storm water management, and materials and waste management activities such as monitoring discharges (dewatering, diversion devices)

  - General site clean-up
  - Vehicle and equipment cleaning, fueling and maintenance
  - Spill control
  - Ensuring that no materials other than storm water are discharged in quantities that will have an adverse effect on receiving waters or storm drain systems, etc.
- Weekly inspections
- Pre-storm inspections
- Post-storm inspections
- Storm event inspections
- Quarterly inspections
- Retaining documentation necessary for the preparation of the annual report
- Ensuring elimination of all unauthorized discharges
- The QSP shall be assigned authority by the SCE Project Manager to mobilize crews in order to make immediate repairs to the control measures
- Coordinate with the SCE Project Manager to assure all of the necessary corrections/repairs are made immediately, and that the Project complies with the SWPPP, the Permit and approved plans at all times
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges

6.2 Contractors List

All Contractors and Subcontractors will be notified of the requirement for storm water management measures during the Project. A list of contractors, subcontractors, and other individuals directed by the QSP will be maintained and included in Appendix H of this SWPPP. If Subcontractors change during the Project, the list will be updated accordingly.

SECTION 7
CONSTRUCTION SITE MONITORING PROGRAM (CSMP)

This CSMP is a guide for the QSP, and/or qualified individual(s) supervised by the QSP, for monitoring and sampling procedures and instructions. The QSP is to determine whether BMPs included in the SWPPP are effective, if immediate actions are needed and/or SWPPP revisions are necessary to reduce pollutants in storm water and authorized non-storm water discharges. If revisions are corrections are determined to be necessary, the QSP shall contact the QSD.

7.1 Objectives

SCE has prepared this CSMP prior to the start of the construction project, so that it shall be implemented immediately upon the start of construction. The CSMP shall be implemented at the appropriate level to protect water quality at all times throughout the life of the project. This CSMP addresses the following objectives:

- Demonstrate that the site is in compliance with the Discharge Prohibitions;
- Determine whether non-visible pollutants are present at the site and are causing or contributing to exceedances of water quality objectives;
- Determine whether immediate corrective actions, additional BMP implementations, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges; and
- Determine whether BMPs are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges

7.2 Implementation Schedule

SCE has prepared this CSMP prior to the start of the construction project, so that it shall be implemented immediately upon the start of construction. The CSMP shall be implemented at the appropriate level to protect water quality at all times throughout the life of the project.

The CSMP shall be revised when:

- Site conditions or construction activities change such that a change in monitoring is required to comply with the requirements and intent of this General Permit; or
- The Regional Water Board requires SCE to revise its CSMP based on its review of the document. Revisions may include, but not limited to, conducting additional site inspections, submitting reports, and certifications. Revisions shall be submitted via postal mail or electronic e-mail.

7.3 Monitoring and Reporting Requirements

Table 7-1
Summary of Monitoring Requirements for Risk Level 1

Risk Level	Visual Inspections						Sample Collection		
	Weekly BMP	Quarterly Non-Stormwater Discharge	Pre-Storm Event		Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water	Non- Visible (when applicable)
			Baseline	REAP					
1	X	X	X	NA	X	X	NA	NA	X

	Type of Monitoring	When
Sampling & Analysis	Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff that is unaffected by the spilled or released material(s).
	Other	RWQCB or TMDLs may require other monitoring.
Visual Inspections	Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and stormwater containments within two business days prior to each qualifying rain event.
	Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained storm water when discharged.
	During rain inspection	See BMP inspection below
	BMP	Weekly and every 24 hours during extended storm events.
	Non-stormwater discharge inspection	Once per quarter (Jan-Mar, Apr-Jun, July-Sept, Oct-Dec)

NA = Not Applicable

7.3.1 Inspection Requirements

SCE is subject to the following inspection requirements:

- SCE shall ensure that all inspections are conducted by trained personnel. The name(s) and contact number(s) of the assigned inspection personnel are listed in this SWPPP.
- SCE shall ensure that all visual inspections are conducted weekly during working hours and in conjunction with other activities in areas where active construction is occurring.
- SCE shall ensure that during storm inspections are conducted at least once each 24-hour period, during extended storm events and are documented (Site Inspection Checklist in Appendix J).
- SCE shall ensure that pre-storm and post-storm inspections are conducted for each qualifying event and documented (Site Inspection Checklist in Appendix J).

- SCE shall conduct quarterly non-stormwater discharge inspections to document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source, and document the response taken to control or eliminate unauthorized non-storm water discharges.
- Inspections may be discontinued in non-active construction areas where soil-disturbing activities are completed and final soil stabilization is achieved (e.g., paving is completed, substructures are installed, vegetation meets minimum cover requirements for final stabilization, or other stabilization requirements are met).
- Inspection programs are required where temporary and permanent stabilization BMPs are installed and are to be monitored after active construction is completed. Inspection activities shall continue until adequate permanent stabilization is established and, in areas where re-vegetation is chosen, until minimum vegetative coverage is established per final stabilization criteria.

7.3.2 Inspection Exceptions

SCE is not required to conduct inspections under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled construction hours (e.g., typical hours 0630 – 1530)

SCE will document why the inspections were not conducted and include these exceptions into the SWPPP and the Annual Report.

7.4 Non-Visible Pollutant Monitoring Requirements

All projects, regardless of risk level, are required to monitor runoff for non-visible pollutants in the event of a BMP failure, breach, or spill. An area unaffected (uncontaminated) by the failure, breach, or spill must also be sampled to serve as the basis of comparison.

7.5 Sample Analysis Plan for Non-Visible Pollutant Monitoring

SCE is subject to the following non-visible pollutant monitoring requirements:

- SCE shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would be visually detectable in storm water;
- SCE is not required to sample if one of the conditions described above (e.g., breach or spill) occurs and the site is cleaned of material and pollutants and/or BMPs are implemented prior to the next storm event;
- SCE shall ensure that water samples are large enough to characterize the site conditions;
- SCE shall collect samples at all discharge locations that can be safely accessed;
- SCE shall collect samples during the first two hours of discharge from rain events that occur during business hours which generate runoff;
- SCE shall analyze samples for the non-visible pollutant parameters, if applicable (see the list of parameters identified in Table 2 –5 Potential Construction Site Pollutants);

- SCE shall collect a sample of storm water that has not come in contact with the disturbed soil or materials stored or used onsite (uncontaminated sample) for comparison with the discharge sample;
- SCE shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis;
- For laboratory analyses, all sampling sample preservation, and other analyses must be conducted according to test procedures pursuant to 40 C.F.R. Part 136. SCE shall ensure that field samples are collected and analyzed according to manufacturer specifications of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specifications; and
- SCE shall keep all field/or analytical data in the SWPPP document.

7.6 Non-Visible Pollutant Sampling Locations

Locations for the collection of non-visible pollutant sampling are described below.

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use; accessibility for sampling, personnel safety; and other factors in accordance with the applicable requirements in the General Permit. Planned sampling locations are dependent on the current construction activities occurring in the construction areas and locations shall be determined by the QSP and shall be shown on the Site Map prior to sampling. Labeling shall be identified as indicated below.

- Based on the QSP's routine monitoring inspections, sampling will be conducted when it is evident that there is erosion and movement of soil, or a breach, malfunction, or spill has occurred. The sampling location(s) will be field located down gradient of the areas that have come into contact with the pollutant material.
    - The down gradient sample location(s), will be designated as D1, D2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Map at the time the location is identified.
- Up gradient sampling locations will be identified for the collection of an uncontaminated runoff sample (background sample) for comparison with the down gradient samples. The up gradient samples will be analyzed for the same non-visible pollutants as the down gradient samples. The location(s) will be selected so that the runoff sample will not have come in contact with the pollutant material.
    - The up gradient sample location(s), will be designated as U1, U2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Map at the time the location is identified.
- Since there are no known areas of historical contamination at this site, there are no designated sampling locations. If areas of contamination are subsequently discovered during construction activities, the SWPPP will be amended by the QSD.

7.7 Safety

Care must be exercised in selecting representative sampling locations and in sample collection to ensure the safety of the sampling crew(s). Avoid entering a water body for sampling if possible. Potential hazards may include but are not limited to the following.

Table 7-2
Potential Safety Hazards

Hazard	Safety Precautions
Animals and Plants	Be alert for the presence of snakes, rodents, insects, and poisonous plants and avoid contact. Long pants are recommended for all field crews.
Construction Operations	Follow construction site safety protocols. Be aware of trip and slip hazards and confirm activities before entering constructions zones. Obey all caution and danger signage.
Lifting heavy objects	Use proper lifting techniques.
Rough terrain	Wear boots with non-slip soles. Use appropriate caution when walking in rough terrain. Two person-sampling crews are recommended when working from or descending steep banks where the water is greater than knee deep.
Weather	Observe weather conditions, avoid lightening strike prone features, wear appropriate clothing, and be aware of flash flood dangers.
Reagents, preservatives	Wear appropriate personal protective equipment (PPE) when using reagents or preservatives.

7.8 Sampling Schedule

Samples for the applicable non-visible pollutant(s) will be collected from the discharge along with a sufficiently large uncontaminated background sample. Samples shall be collected during the first two hours of discharge from rain events, during business hours, and which generate runoff.

7.8.1 Sampling Personnel

Samples on the Project site will be collected by the following AEI-CASC sampling personnel:

Name/Telephone Number: Matt Renaud, CPESC (818) 263-3566

Name/Telephone Number: Michael O'Hearn, CESSWI (714) 497-7276

Alternate(s)/Telephone Number: _____

Alternate(s)/Telephone Number: _____

All sampling personnel and alternates will review the CSMP, described herein for the qualifications of designated contractor personnel describing environmental sampling training and experience as provided in Appendix I.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the Project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come in contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule described above.

Supplies maintained at the Project site will include, but are not limited to, surgical gloves, sample collection equipment (bailers, etc.), coolers, appropriate number and volume of sample bottles, identification labels, resealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms.

AEI-CASC will obtain and maintain the field-testing instruments, as described under Sample Analysis, for analyzing samples in the field by contractor sampling personnel.

Safety practices for sample collection will be in accordance with AEI-CASC Consulting's ***Health and Safety Plan, August 2007***.

7.8.2 Analytical Constituents

Table 7-3 lists the sources of and types of potential non-visible pollutants on the Project and the applicable water quality indicator parameter(s) for that pollutant. Refer to Appendix J for The Construction Material and Pollutant Testing Guidance Table - Non-Visible Pollutants, which contains a partial list of additional common sources of non-visible pollutants.

Table 7-3
Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Vehicle batteries	Sulfate or pH	Sulfuric acid or pH
Cleaning products	Acids/ Bleaches/ Solvents	pH/ chlorine/ VOC, SVOC
Masonry products	pH, Alkalinity	pH, Alkalinity
Adhesives	Adhesives	COD/ Phenols/ SVOC
Vehicle	Batteries	Sulfuric Acid, Lead, pH
Treated wood products	ACZA, CCA, ACA, Copper Naphthenate	Arsenic, Chromium (Total), Copper, and Zinc

7.8.3 Sample Collection Procedures

Samples of discharge will be collected at the designated sampling locations described in 7.6 and as shown on the Site Map in Appendix B for locations of observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples will be collected and preserved in accordance with the methods identified in Table 7-5. Only personnel trained in proper water quality sampling will collect samples.

Samples will be collected by following the steps outlined below:

1. Place a laboratory provided sampling container directly into a stream of water downgradient and within close proximity to the potential non-visible pollutant discharge location;
2. Transfer the collected sample into the sample bottles (supplied by the lab for the appropriate parameters being monitored) filling the bottles completely (or as instructed by the laboratory);
3. The upgradient (uncontaminated) background samples will be collected first, prior to collecting the downgradient sample, in order to minimize cross-contamination; and
4. Sampling personnel will collect the water upgradient of where they are standing.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of powder-free nitrile gloves prior to the collection and handling of each sample at each location;
- Not contaminate the inside of the sample bottle by allowing it to come into contact with any material other than the water sample;
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection;
- Not leave the cooler lid open for an extended period of time once samples are placed inside;
- Not sample near a running vehicle where exhaust fumes may impact the sample;
- Not touch the exposed end of a sampling tube, if applicable;
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles;
- Not eat, smoke, or drink during sample collection nor sneeze or cough in the direction of an open sample bottle;
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample;
- Decontaminate sampling equipment prior to sample collection using a tri-sodium phosphate (TSP) solution water wash and triple rinse with distilled or de-ionized water; and
- Dispose of decontamination water/soaps appropriately (i.e., do not discharge to the storm drain system or receiving water).

7.8.4 Sample Documentation

Sample documentation consists of appropriate information onto sample bottle identification labels, Chain-of-Custody forms, Sampling Activity Logs, and Inspection Checklists. It is important that waterproof labels, paper, and ink are used. These will be considered recordable documents. If an error is made on a document, the individual shall make corrections by lining through the error, initial and date, and entering the correct information. Copies of the Sampling Activity Log will be maintained in Appendix J.

Sampling and field analysis activity will be documented using the following forms:

- Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:
  - Project name
  - Project number
  - Unique sample identification number and location. (Example: Ivanpah-D1-110810 which would denote Project Name [Ivanpah], Sample Site [D1], Sample Date [mmddyy])
  - Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation (Example: Ivanpah -D1-110810-DUP1).
  - Collection date/time
  - Analysis constituent
- Sampling Activity Logs: A log of sampling events will identify:
  - Sampling date

- Separate times for collected samples and QA/QC samples recorded to the nearest minute (am/pm)
- Unique sample identification number and location
- Analysis constituent
- Names of sampling personnel
- Weather conditions (including precipitation amount)
- Field analysis results
- Other pertinent data

- Chain-of-Custody (COC) forms: All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Proper transferring of responsibility must be recorded on the COC signature fields, the final signature will be of the receiving lab personnel. COC procedures will be strictly adhered to for QA/QC purposes.
- Storm Water Quality Construction Inspection Checklists: When applicable, the contractor's storm water inspector will document on the checklist that samples for non-visible pollutants were taken during a rain event.

7.8.5 Laboratory Analysis

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a Chain-of-Custody form provided by the analytical laboratory, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to the following California state-certified laboratory:

Laboratory Name:	Calscience Environmental Laboratories, Inc.
Address:	7440 Lincoln Way
	Garden Grove, CA
Telephone Number:	714-895-5494
Point of Contact:	

7.8.6 Sample Analysis

Samples will be analyzed for the applicable constituents using the analytical methods identified in Table 7-5 (Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants).

Laboratory Analysis: For samples that will be analyzed by a laboratory, sampling, preservation and analysis shall be performed by a state-certified laboratory in accordance with 40 CFR Part 136.

Field Analysis: For samples collected for field analysis, the collection, analysis, and equipment calibration will be in accordance with field instrument manufacturer's specifications. Table 7-4 lists the type of instruments used in the field for particular parameters.

Table 7-4
Field Analysis Instrumentation

Field Instrument	Constituent
pH Meter	pH
Turbidity Meter	Turbidity

- The instruments will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling event.
- Maintenance and calibration records will be maintained with the SWPPP.

Table 7-5
Sample Collection, Preservation and Analysis for Non-Visible Pollutants
EXAMPLE TABLE (call laboratory for specifications)

Parameter	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3 x 40 mL	VOA-glass	Store at 4° C, HCl to pH<2	1 ug/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass-amber	Store at 4° C	10 ug/L	7 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-amber	Store at 4° C	0.1□ug/L	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-amber	Store at 4° C	Check Lab	7 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4° C	1 mg/L	48 hours
COD	EPA 410.4	1 x 250 mL	Glass-Amber	Store at 4° C, H2SO4 to pH<2	5 mg/L	28 days
DO	SM 4500-O G	1 x 250 mL	Glass-Amber	Store at 4° C	Check Lab	8 hours
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	unitless	Immediate
Alkalinity	SM 2320B	1 x 250 mL	Polypropylene	Store at 4° C	1 mg/L	14 days
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4° C, HNO3 to pH<2	0.1 mg/L	6 months
Metals (Chromium VI)	EPA 7199	1 x 500 mL	Polypropylene	Store at 4° C	01□ug/L	24 hours

- **Notes:**

°C	–	Degrees Celsius	ug/L	–	Micrograms per Liter
BOD	–	Biological Oxygen Demand	ml	–	Milliliter
COD	–	Chemical Oxygen Demand	PCB	–	Polychlorinated Biphenyl
DO	–	Dissolved Oxygen	SVOC	–	Semi-Volatile Organic Compound
EPA	–	Environmental Protection Agency	SM	–	Standard Method
HCl	–	Hydrogen Chloride	TPH	–	Total Petroleum Hydrocarbons
H2SO4	–	Hydrogen Sulfide	TRPH	–	Total Recoverable Petroleum Hydrocarbons
HNO3	–	Nitric Acid	VOA	–	Volatile Organic Analysis
L	–	Liter	VOC	–	Volatile Organic Compound
mg/L	–	Milligrams per Liter			

7.9 Quality Assurance and Quality Control

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or 1 duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicates will be collected where contamination is likely, not on the background sample. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

7.10 Retention of Records

All records, storm water monitoring information, lab data, and reports, including the Annual Report and supportive documentation, shall be retained for a period of at least three years. These records shall include:

A. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

B. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

C. The date and approximate time of analyses.

D. The individual(s) who performed the analyses.

E. A summary of all analytical results from the last three years, the method detection limits and reporting units, and the analytical techniques or methods used.

F. Rain gauge readings from site inspections.

G. Quality assurance/quality control records and results.

H. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records.

I. Visual observation and sample collection exception records.

J. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

APPENDIX A

CONSTRUCTION GENERAL PERMIT

ORDER NO. 2009-0009-DWQ AND AMENDMENT ORDER NO. 2010-0014-DWQ

The complete document can be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_complete.pdf

Will be placed in field SWPPP

APPENDIX B

SUBMITTED PERMIT REGISTRATION DOCUMENTS

1. Notice of Intent (NOI) – To be included in field SWPPP
2. Risk Assessments Worksheets
3. Site Plans (Vicinity Map, Erosion Control Plans)
4. WDID Confirmation Letter – To be included in field SWPPP
5. Signed Certification Statements – To be included in field SWPPP

SCE:

IVANPAH MATERIAL STORAGE YARD

NOTICE OF INTENT (NOI)

State Water Resources Control Board

NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY
(WQ ORDER No. 2009-0009-DWQ)

WDID: **Risk Level:** Level1

Property Owner Information

Type: Special District

Name: Southern California Edison
Address: 8631 Rush Street
Address 2:
City/State/Zip: Rosemead CA 91770

Contact Name:
Title:
Phone #: 310-990-1745
Email: john.slayton@sce.com

Contractor/Developer Information

Name: Southern California Edison
Address: 8631 Rush Street
Address 2:
City/State/Zip: Rosemead CA 91770

Contact Name: John Slayton
Title:
Phone #: 310-990-1745
Email: john.slayton@sce.com

Construction Site Information

Site Name: Ivanpah Material Storage Yard
Address: North of Coloseum Rd
City/State/Zip: Ivanpah CA 92364
County: San Bernardino
Latitude: 35.546946 Longitude: -115.470473
Total Size of Construction Area: 40
Total Area to be Disturbed: 17

Contact Name: John Slayton
Title: TDBU QSP
Site Phone #: 310-990-1745
Email: john.slayton@sce.com
Construction Start: September 01, 2011
Complete Grading:
Final Stabilization: December 30, 2011

Risk Values

R: 6.57 K: 0.32 LS: 2.76 Beneficial Uses/303(d): No

Type of Construction: *Utility: Material Storage Yard for EITP Construction
Receiving Water: Ivanpah Lake
Qualified SWPPP Developer: Melanie Sotelo
Certification #:
RWQCB Jurisdiction: Region 6B - Victorville
Phone: 760-241-6583
Email: r6b_stormwater@waterboards.ca.gov

Certification

Name
Date:
Title:

SCE:

IVANPAH MATERIAL STORAGE YARD

RISK ASSESSMENT

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: Ivanpah Material Storage Area
Start Date: 09/01/2011
End Date: 03/30/2012
Latitude: 35.5566
Longitutde: -115.4700

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF **6.57** HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **09/01/2011 - 03/30/2012**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do not qualify for a waiver from NPDES permitting requirements.**

[redacted]

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.	
http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	6.57
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.	
Site-specific K factor guidance	
http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	0.32
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.	
LS Table	
LS Factor Value	2.76
Watershed Erosion Estimate (=RxKxLS) in tons/acre	5.802624
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	yes/no	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbguse.asp	**No**	**Low**

Combined Risk Level Matrix

Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	
High	Level 2		Level 3

Project Sediment Risk: Low

Project RW Risk: Low

Project Combined Risk: Level 1

SCE:

IVANPAH MATERIAL STORAGE YARD

SITE PLANS (VICINITY MAP, SITE MAP)

VICINITY MAP
FOR
IVANPAH MATERIAL STORAGE YARD
IVANPAH, SAN BERNARDINO COUNTY

N

N.T.S.

VICINITY MAP

FOR

IVANPAH MATERIAL STORAGE YARD

IVANPAH, SAN BERNARDINO COUNTY

N.T.S.

VICINITY MAP
FOR
IVANPAH MATERIAL STORAGE YARD
IVANPAH, SAN BERNARDINO COUNTY

N

N.T.S.

SHEET 2 OF 3

VICINITY MAP

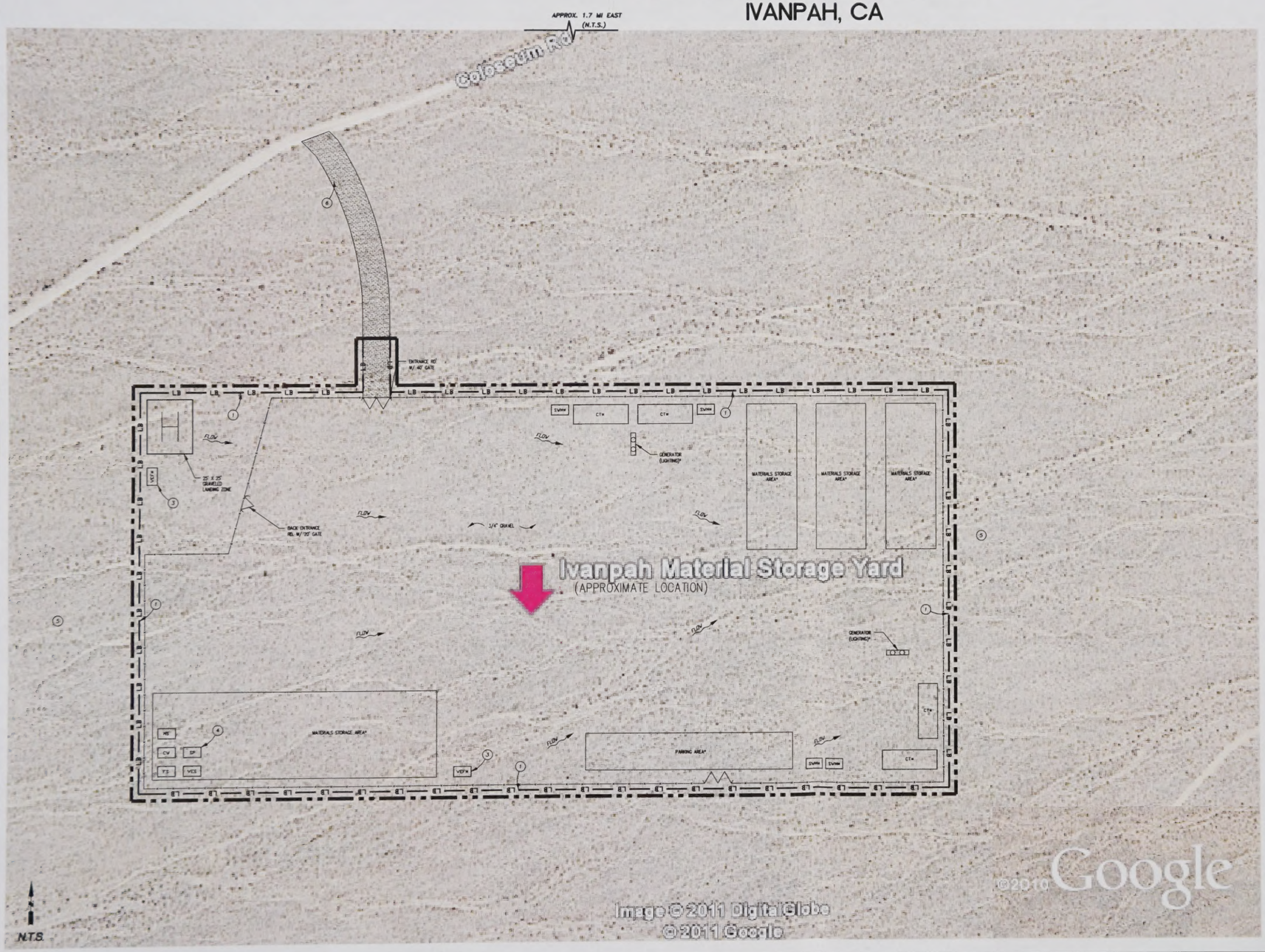
FOR

IVANPAH MATERIAL STORAGE YARD

IVANPAH, SAN BERNARDINO COUNTY

N.T.S.

SITE MAP
FOR
IVANPAH MATERIAL STORAGE YARD
ADJACENT TO COLOSEUM ROAD
IVANPAH, CA



WATER POLLUTION CONTROL NOTES

1. INSTALL SILT FENCE, FIBER ROLL OR GRAVEL BAG LINEAR BARRIER PER CASQA BMP SE-1, SE-5, SE-6.
2. IMPLEMENT STREET SWEEPING AND VACUUMING PER CASQA BMP SE-7.
3. IMPLEMENT VEHICLE AND EQUIPMENT FUELING PER CASQA BMP NS-9.
4. IMPLEMENT VEHICLE AND EQUIPMENT STORAGE AND FUELING, MATERIALS STORAGE, STOCKPILE MANAGEMENT, CONCRETE WASTE MANAGEMENT, AND SANITARY WASTE MANAGEMENT IN THE STAGING AREA PER CASQA BMPS NS-10, WM-1, WM-3, WM-8, AND WM-9.
5. UPSTREAM AND DOWNSTREAM SAMPLING LOCATIONS TO BE FIELD LOCATED.
6. INSTALL TEMPORARY STABILIZED CONSTRUCTION ROADWAY FROM IVANPAH SUBSTATION LAYDOWN YARD ENTRANCE/EXIT TO COLESEUM ROAD PER CASQA BMP TC-2.

LEGEND

- MS — MATERIAL STORAGE
- CW — CONCRETE WASHOUT
- FS — FUEL STORAGE
- SWM — SANITARY WASTE MANAGEMENT
- SP — STOCKPILE MANAGEMENT
- VES — VEHICLE AND EQUIPMENT STORAGE
- VEF — VEHICLE AND EQUIPMENT FUELING
- CT — CONSTRUCTION TRAILER
- PROJECT BOUNDARY
- LB — LINEAR BARRIER (SE-1, SE-5, or SE-6)
- PROPOSED 6' CHAINLINK FENCE W/ SCREENING
- FLOW — FLOW DIRECTION

APPROX. 17 ACRES DISTURBED AREA

GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE CONTRACTOR AND SUBCONTRACTORS TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.
3. SECTION 3 OF THE SWPPP DESCRIBES THE BEST MANAGEMENT PRACTICES TO BE USED ON THIS SITE.
4. IMPLEMENTATION OF THE VARIOUS WATER POLLUTION CONTROL MEASURES WILL CONFORM TO THE REQUIRED CONSTRUCTION STAGING REQUIREMENTS.

* PROPOSED PROJECT – PERMANENT FEATURES

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: IVANPAH MATERIAL STORAGE YARD

STORM WATER POLLUTION PREVENTION PLAN
SITE MAP

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO.
SITE MAP-01

SCALE: N.T.S.

1 OF 1 SHTS.

SCE:

IVANPAH MATERIAL STORAGE YARD

WDID CONFIRMATION LETTER

SCE:

IVANPAH MATERIAL STORAGE YARD

SIGNED CERTIFICATION STATEMENTS

APPENDIX C

AMENDMENT LOG

SWPPP AMENDMENT LOG

Project Name: Ivanpah Material Storage Yard

Amendment No.	Prepared by QSD	Brief Description of Amendment	Date

APPENDIX D

CONSTRUCTION SCHEDULE

9/1/11	Estimated Project Start
12/31/11	Estimated Yard Ready to Receive Materials
3/30/12	Estimated Project Completion

Construction Schedule

Estimated Dates	Event or Construction Phase
9/1/11	Estimated Project Start
12/21/11	Estimated Yard Ready to Receive Materials
3/30/12	Estimated Project Completion

Construction Schedule

9/1/11	Estimated Project Start
12/1/11	Estimated Yard Ready to Receive Materials
9/30/12	Estimated Project Completion

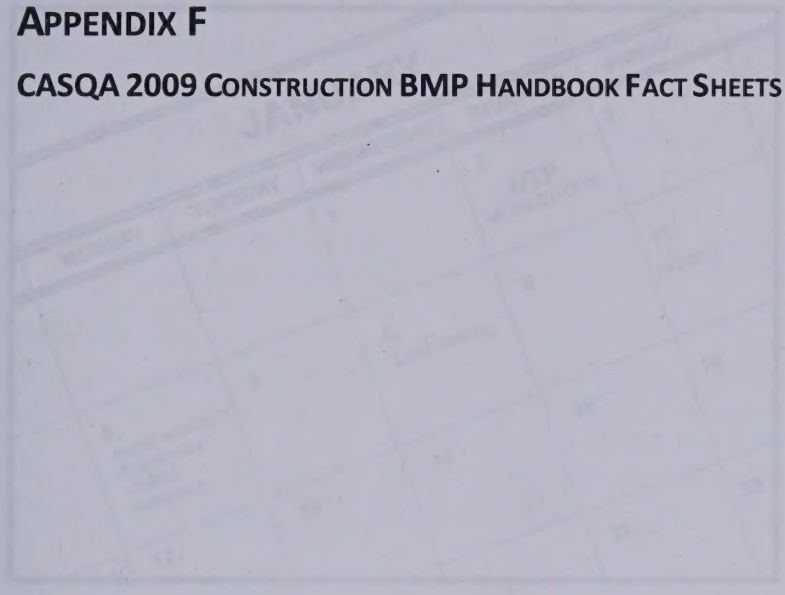
APPENDIX E

CONSTRUCTION ACTIVITIES, MATERIALS USED AND ASSOCIATED POLLUTANTS

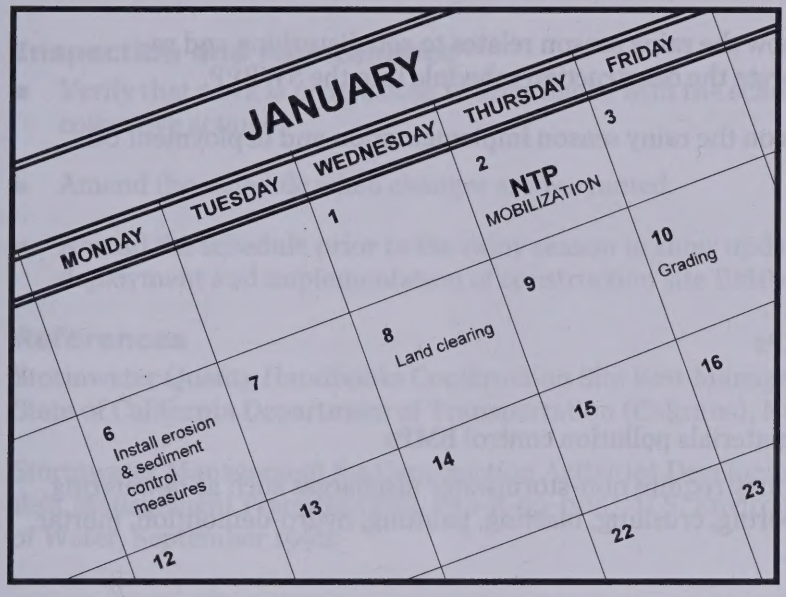
(Included in Section 2.5 of the text)

APPENDIX F

CASQA 2009 CONSTRUCTION BMP HANDBOOK FACT SHEETS



Scheduling EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

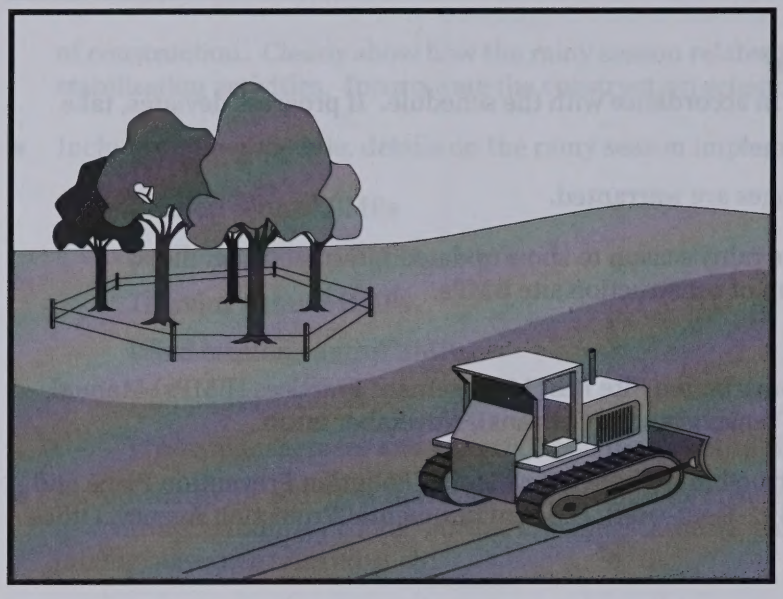
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Limitations

- Requires forward planning by the owner/developer,

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contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

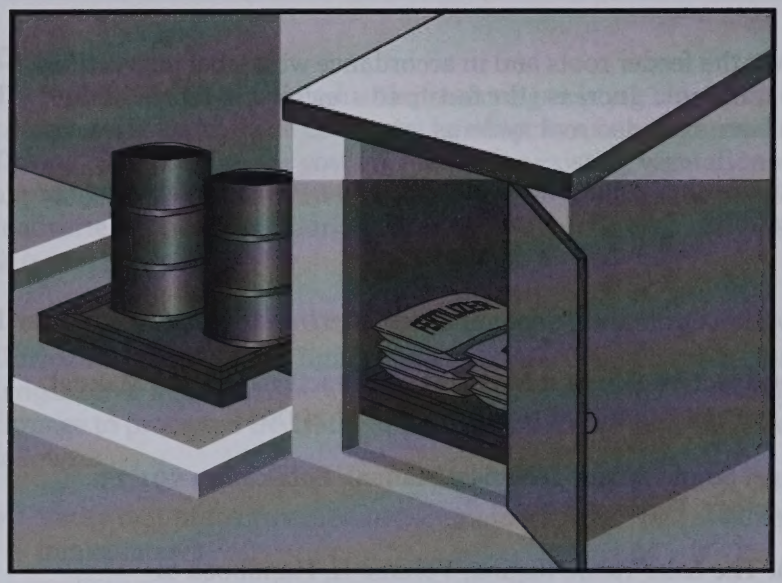
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Material Delivery and Storage WM-1



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
  - Avoid transport near drainage paths or waterways.
  - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
  - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References

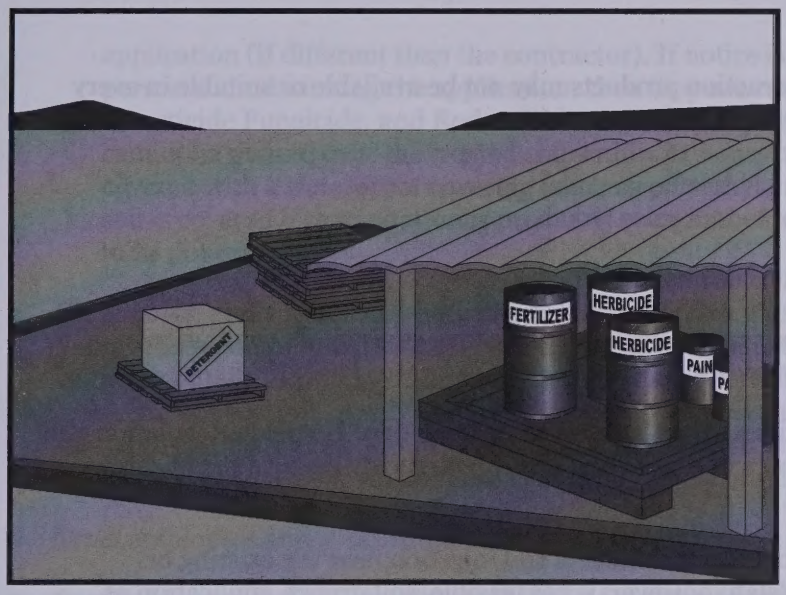
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

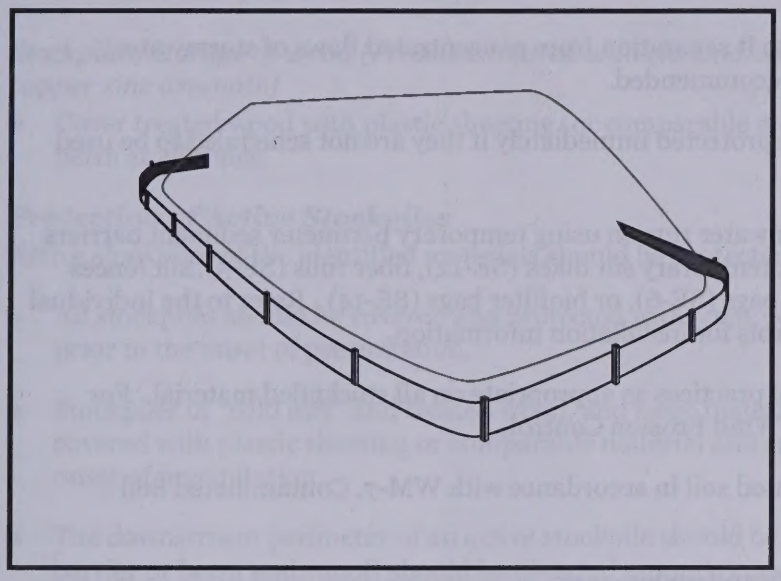
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Potential Alternatives
None

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Cover and project soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

Stockpiles of fly ash, stucco, hydrated lime

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

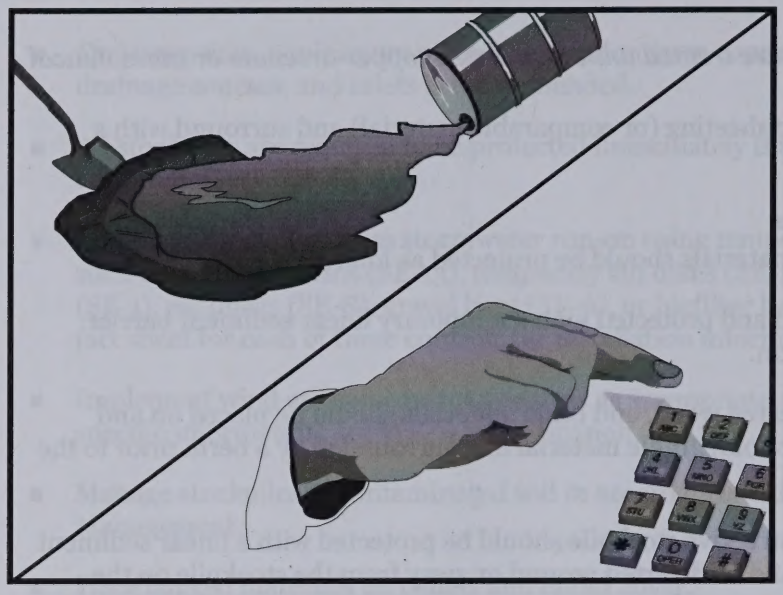
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

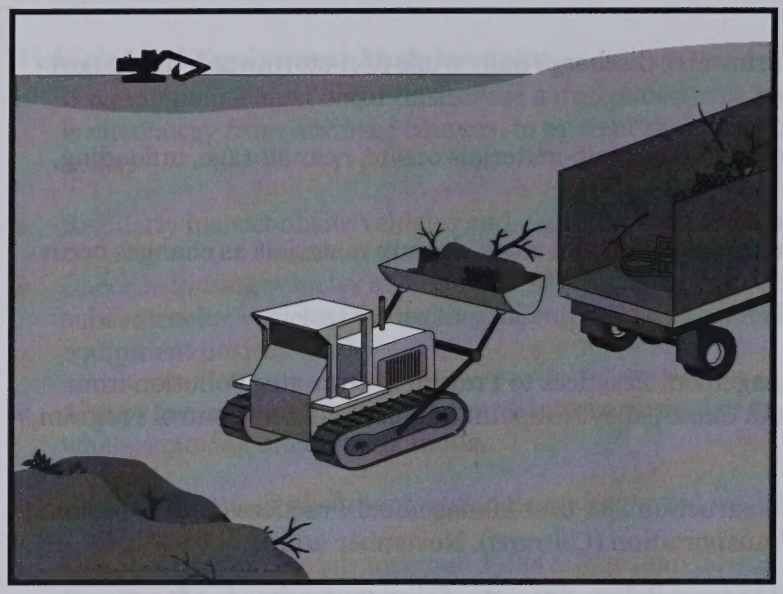
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

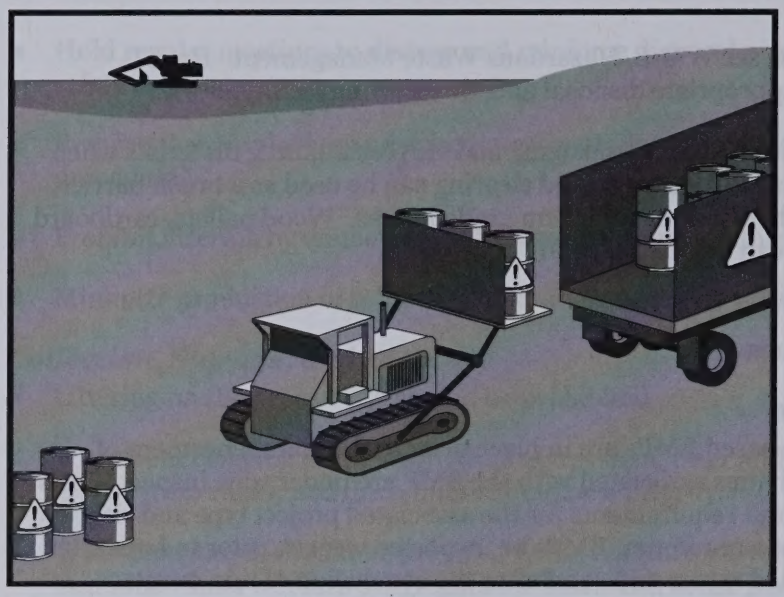
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Hazardous Waste Management WM-6



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

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In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
  - Ensure that adequate hazardous waste storage volume is available.
  - Ensure that hazardous waste collection containers are conveniently located.
  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
  - Minimize production or generation of hazardous materials and hazardous waste on the job site.
  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
  - Segregate potentially hazardous waste from non-hazardous construction site debris.
  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

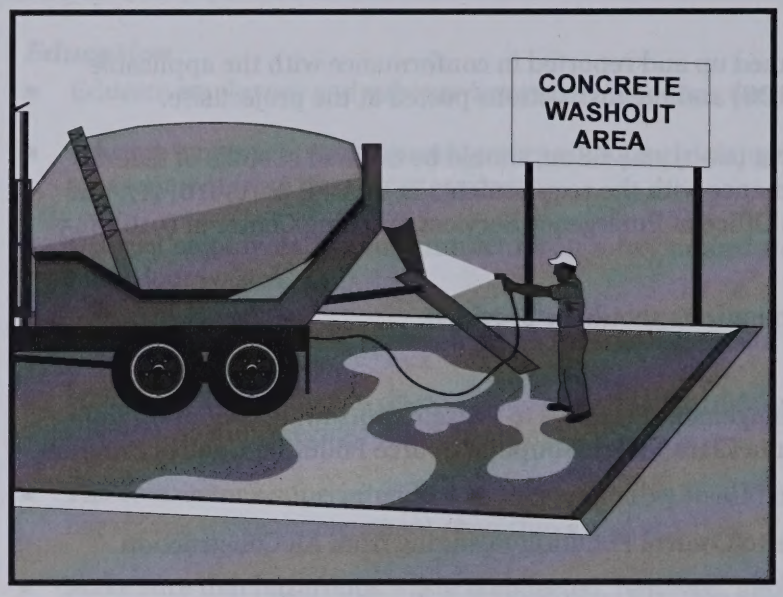
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

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- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washout should be lined so there is no discharge into the underlying soil.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a "roll-off"; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

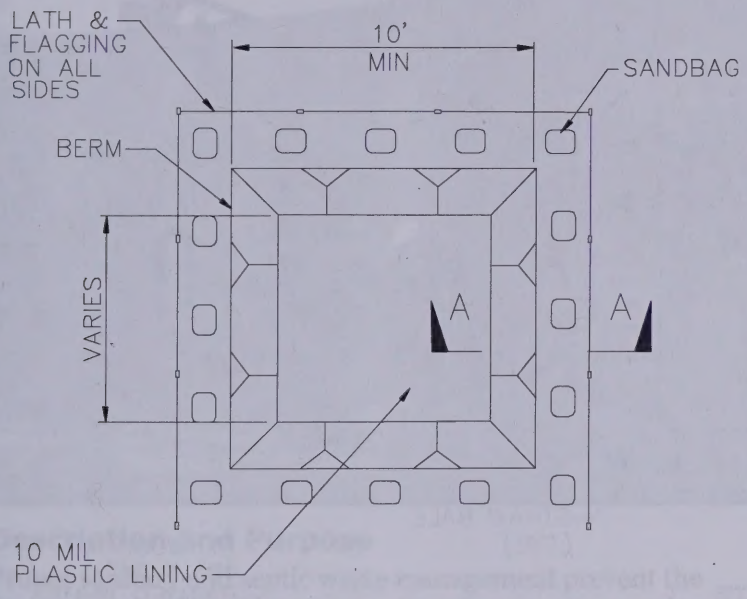
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

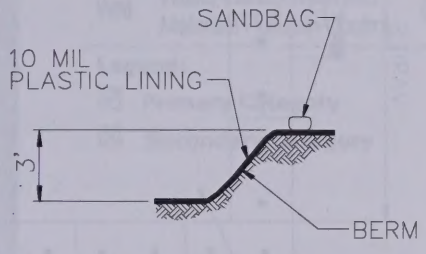
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

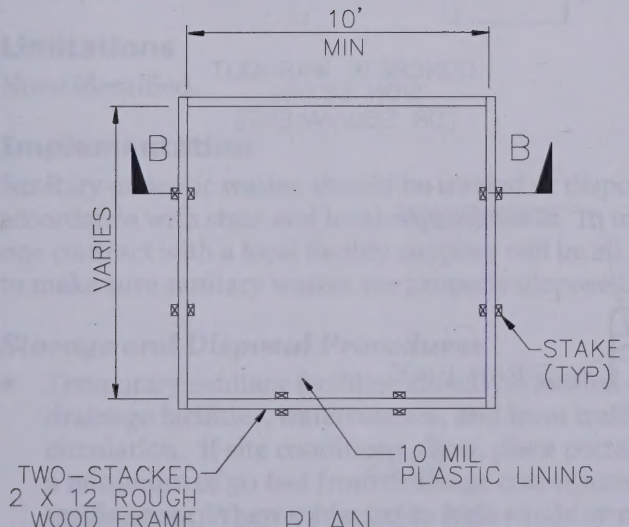
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



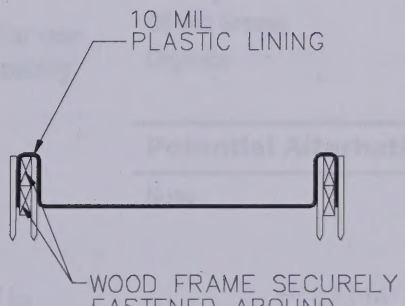
PLAN
NOT TO SCALE
TYPE "BELOW GRADE"



SECTION A–A
NOT TO SCALE



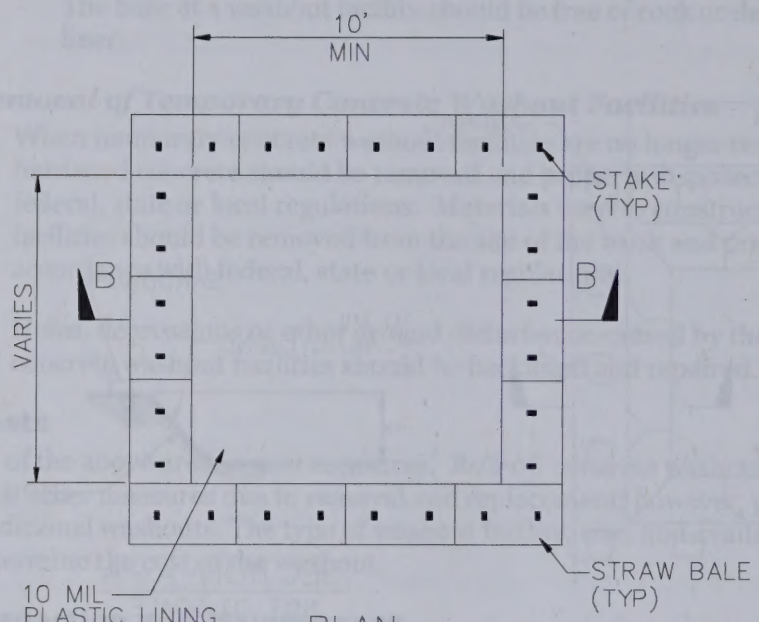
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



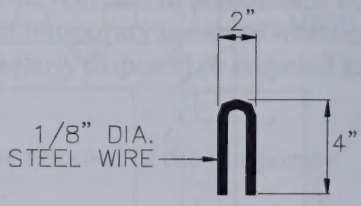
SECTION B–B
NOT TO SCALE

NOTES

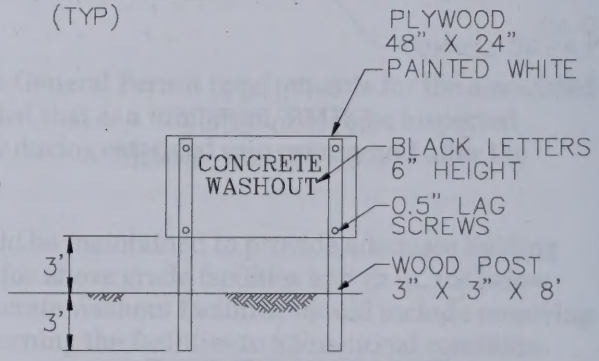
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



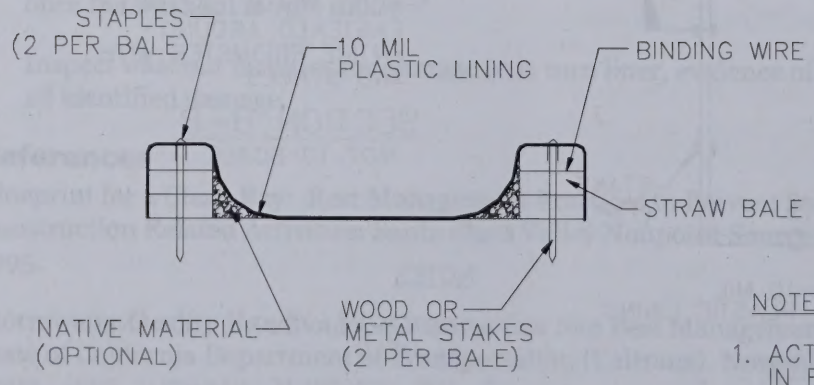
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

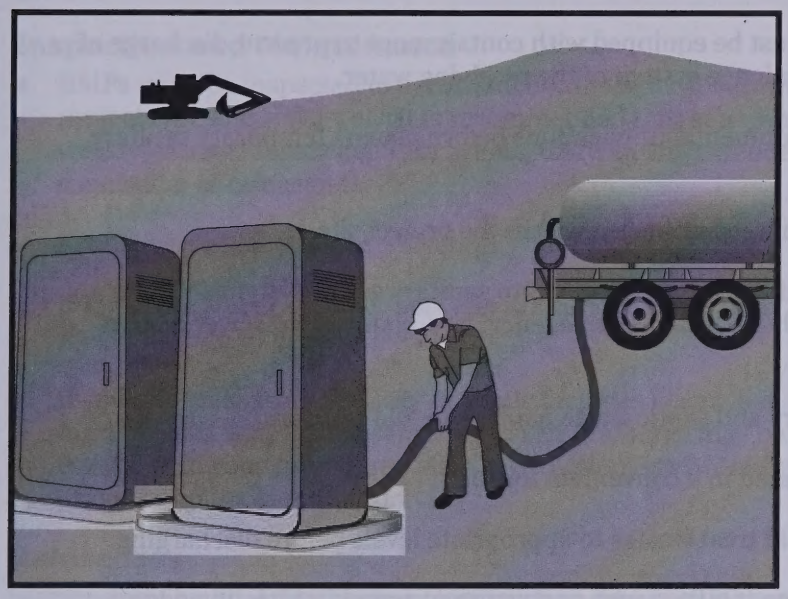


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

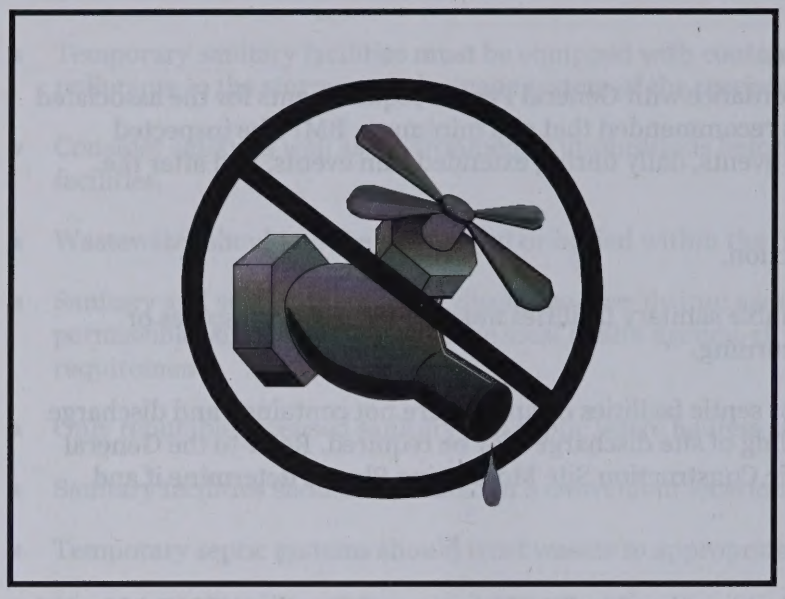
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

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into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Illicit Connection/Discharge NS-6

Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

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of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General** – unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

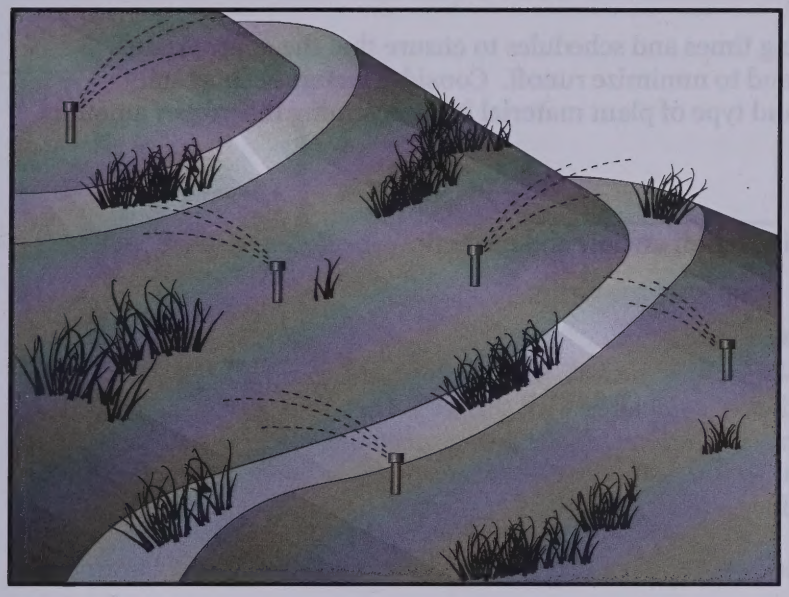
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water/Irrigation NS-7



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for

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excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

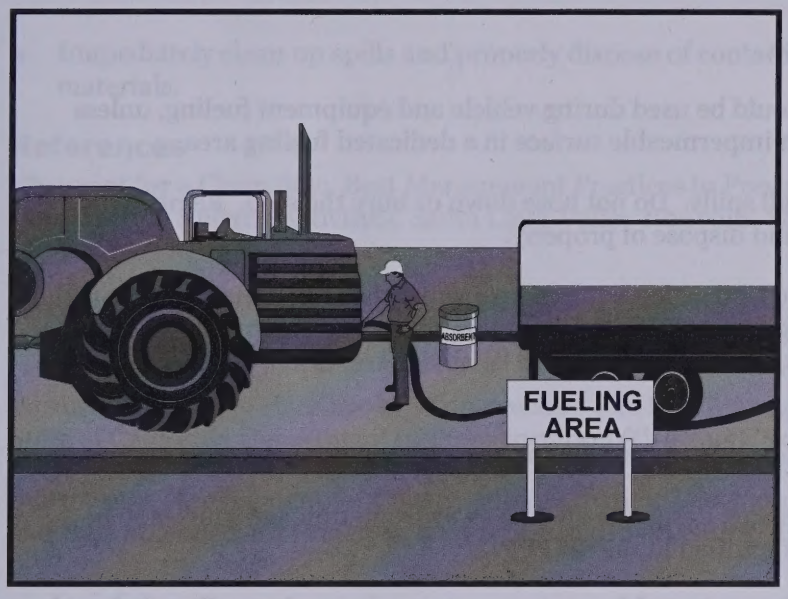
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Fueling NS-9



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

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be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

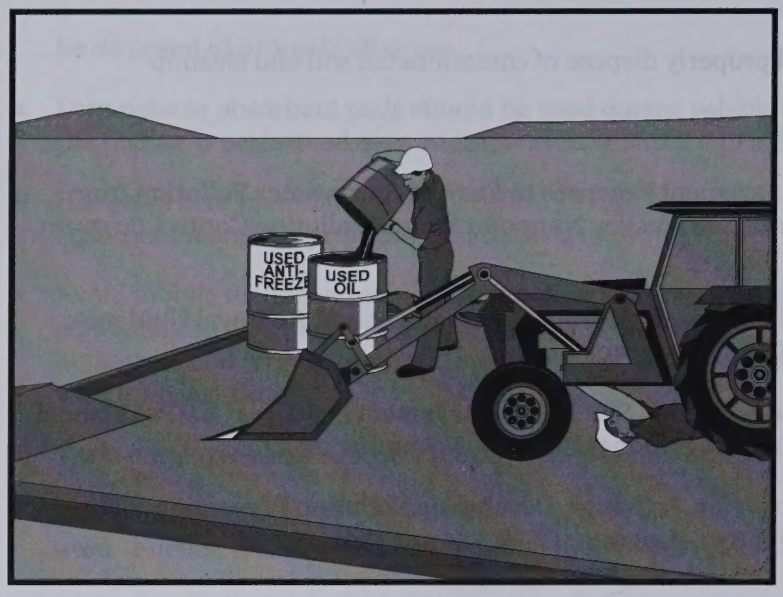
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and

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Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

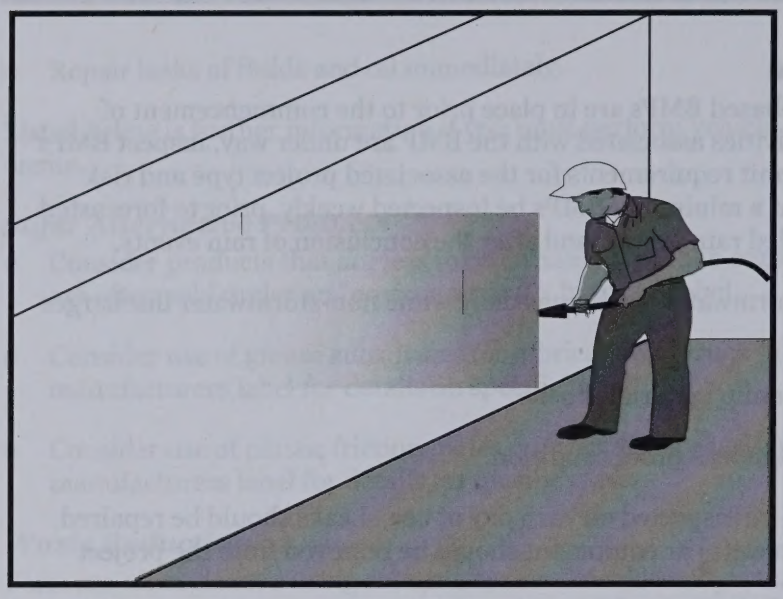
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Concrete Curing NS-12



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

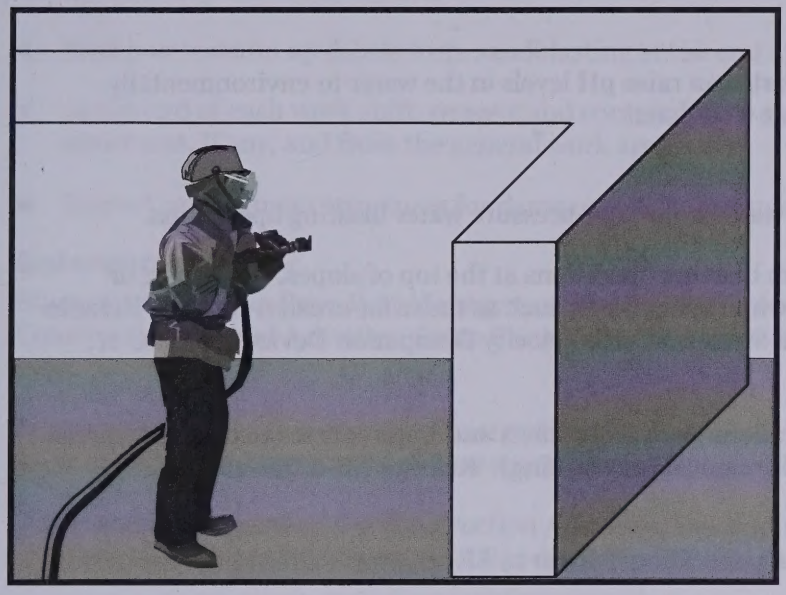
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

EC	Erosion Control	
SE	Sediment Control	
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WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

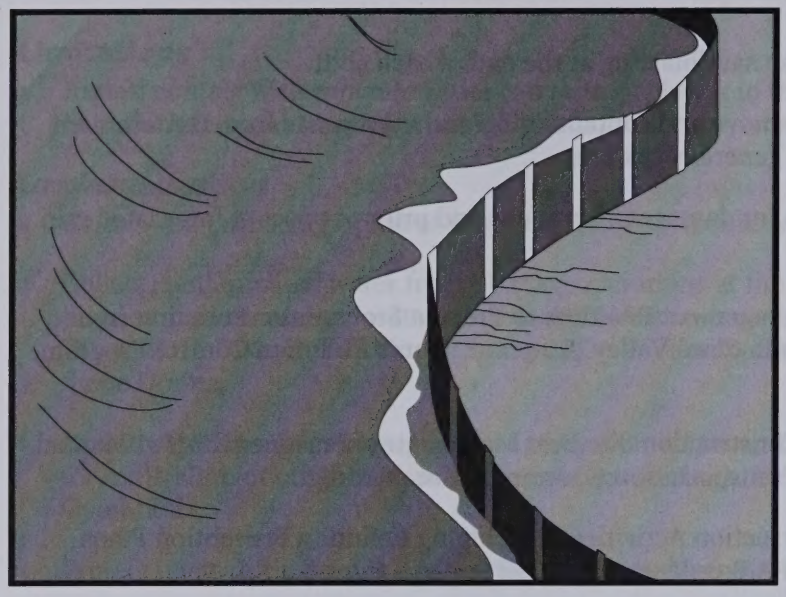
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Silt Fence SE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☑
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Legend:

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☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-10 Storm Drain Inlet Protection

SE-14 Biofilter Bags

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The

reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec^{-1} and 0.15 sec^{-1} in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.

- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with native material and compacted.

- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the

toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of $^1/_3$ and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the gerotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
    - Minimal soil disturbance.
    - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
    - Uniform installation.
    - Less susceptible to undercutting/undermining.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Silt Fence

SE-1

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

Silt Fence

SE-1

SECTION A–A

DETAIL A

JOINING SECTION DETAIL (TOP VIEW)

END STAKE DETAIL (TOP VIEW)

END DETAIL

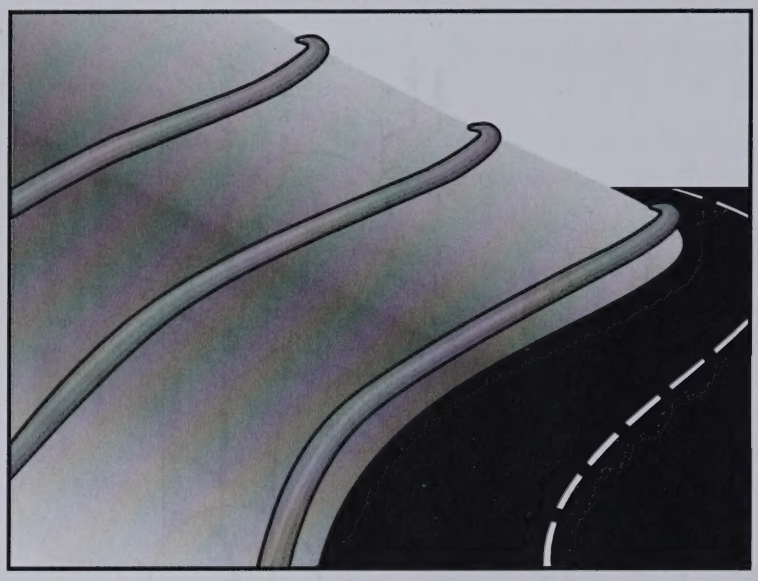
STAPLE DETAIL

(SEE NOTE 9)

OPTIONAL MAINTENANCE OPENING DETAIL

(SEE NOTE 11)

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
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WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

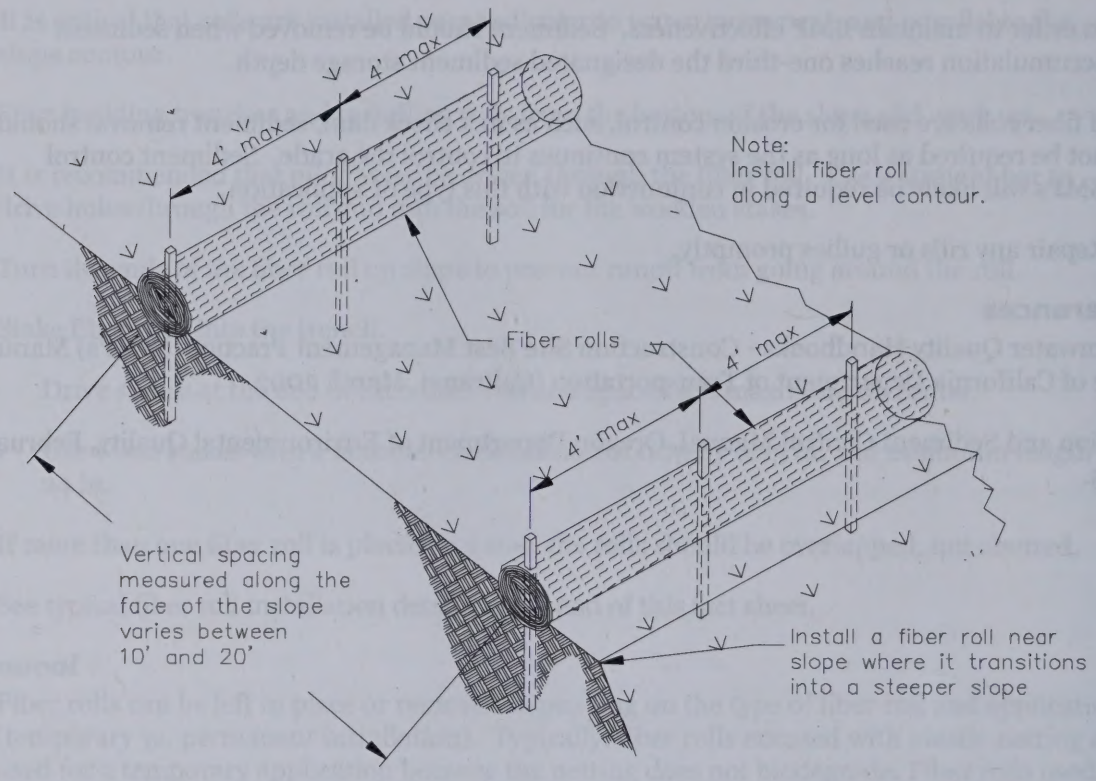
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

References

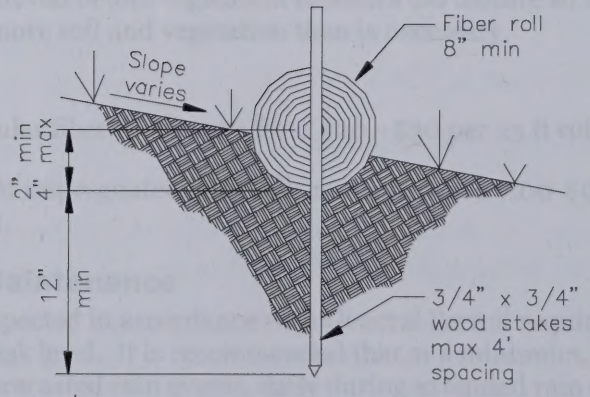
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION

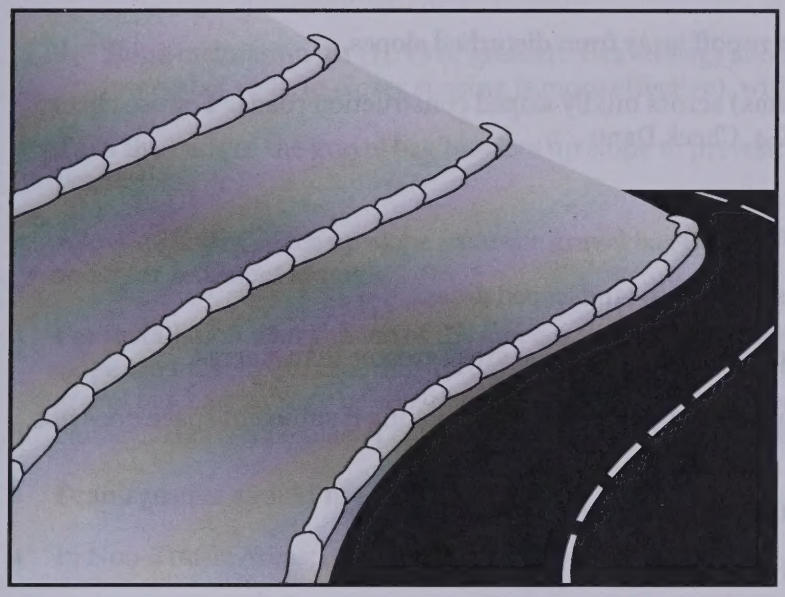
N.T.S.



ENTRENCHMENT DETAIL

N.T.S.

Gravel Bag Berm SE-6



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Roll
SE-8 Sandbag Barrier
SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- ***Bag Material:*** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- ***Bag Size:*** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.
- ***Fill Material:*** Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7

Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

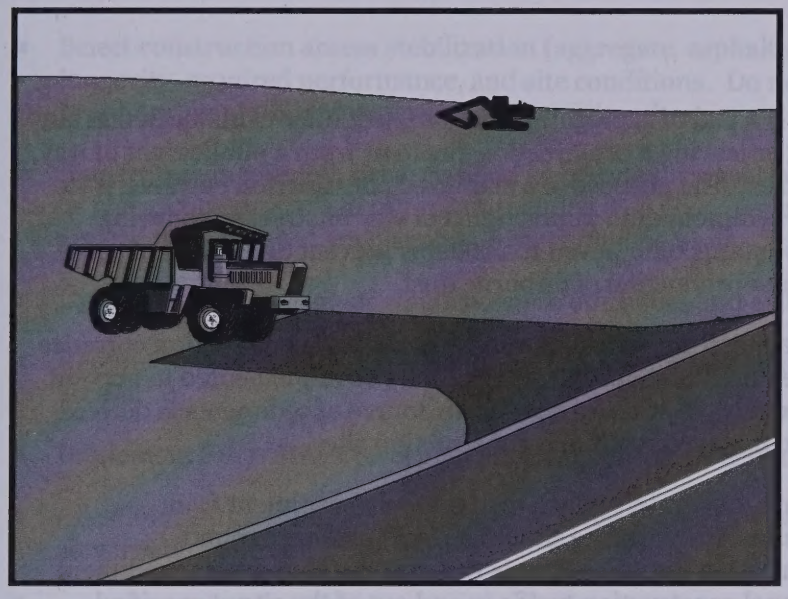
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Stabilized Construction Entrance/Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

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Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

Stabilized Construction Entrance/Exit TC-1

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

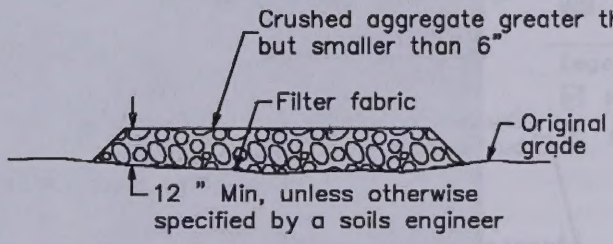
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

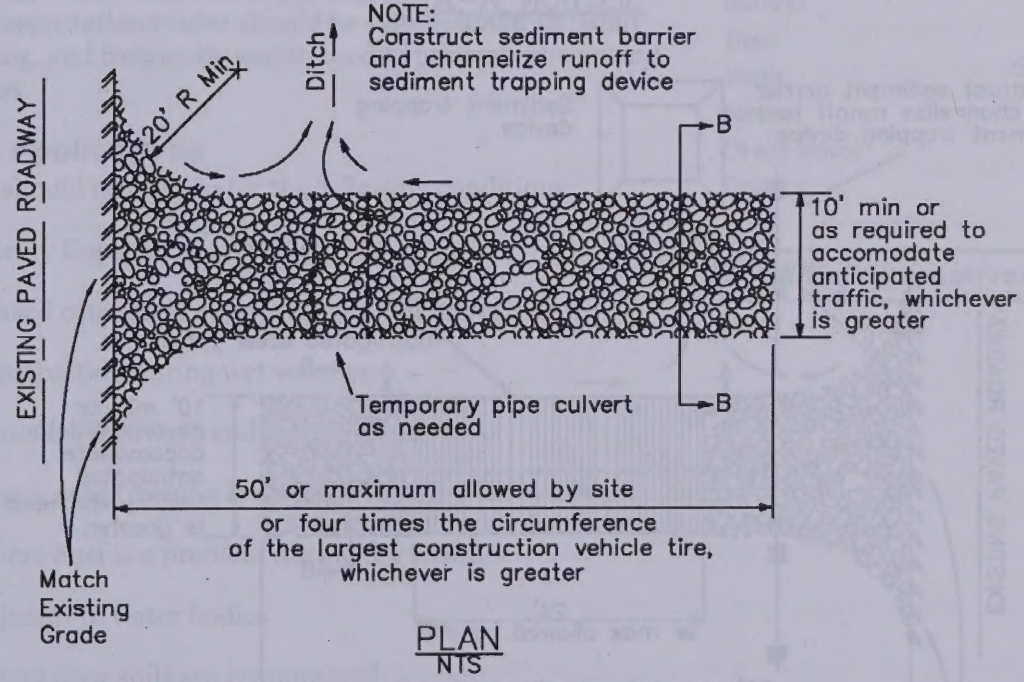
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance/Exit TC-1

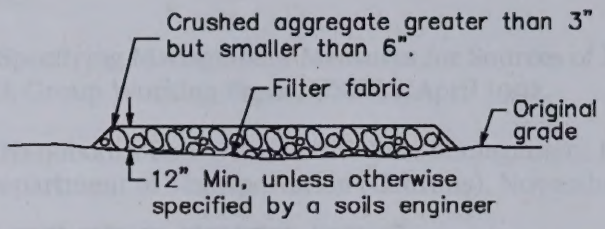

Crushed aggregate greater than 3" but smaller than 6"
Filter fabric
Original grade
12 " Min, unless otherwise specified by a soils engineer

SECTION B–B
NTS

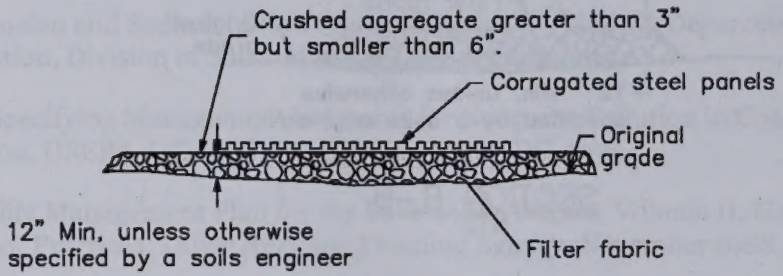

NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Ditch
20' R Min
EXISTING PAVED ROADWAY
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater
Temporary pipe culvert as needed
50' or maximum allowed by site
or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade

PLAN
NTS

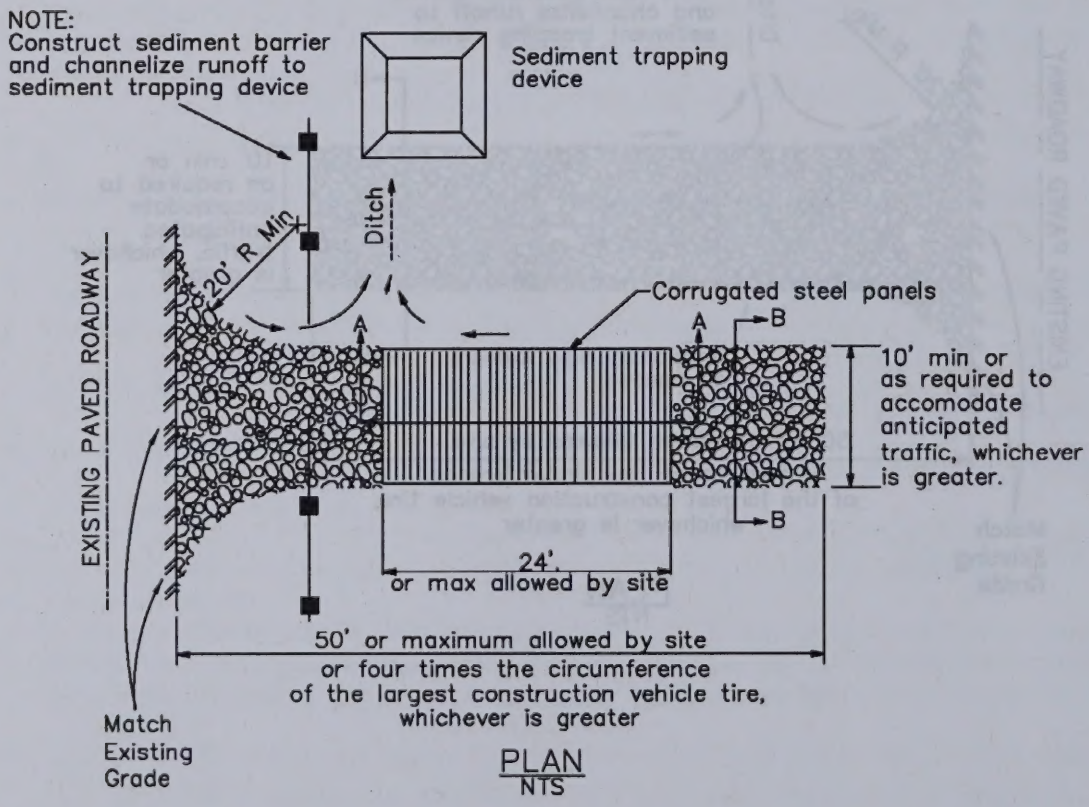
Stabilized Construction Entrance/Exit TC-1


Crushed aggregate greater than 3" but smaller than 6".
Filter fabric
Original grade
12" Min, unless otherwise specified by a soils engineer

SECTION B–B
NTS

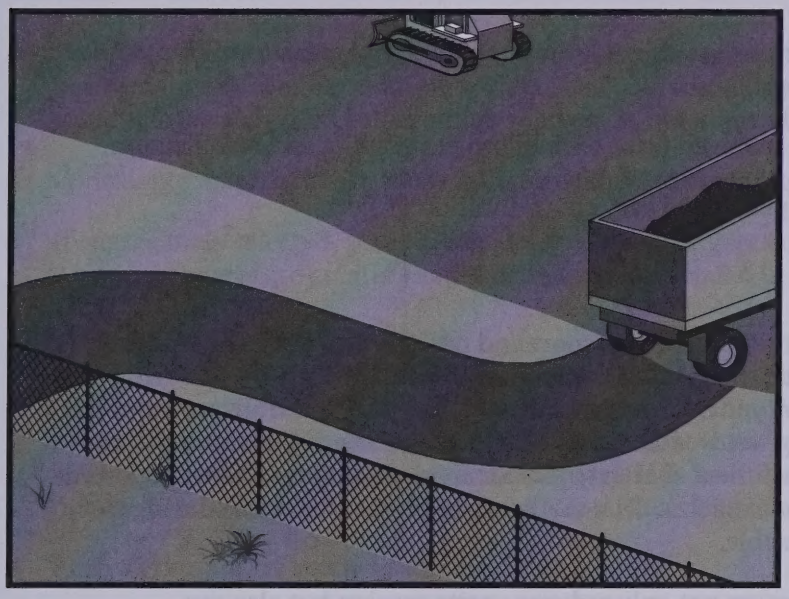

Crushed aggregate greater than 3" but smaller than 6".
Corrugated steel panels
Original grade
12" Min, unless otherwise specified by a soils engineer
Filter fabric

SECTION A–A
NOT TO SCALE


NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Sediment trapping device
Ditch
20' R Min.
EXISTING PAVED ROADWAY
Corrugated steel panels
A
A
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater.
24', or max allowed by site
50' or maximum allowed by site
or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade

PLAN
NTS

Stabilized Construction Roadway TC-2



Description and Purpose

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

Suitable Applications

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

Limitations

- The roadway must be removed or paved when construction is complete.
- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used. See WE-1, Wind Erosion Control.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.
- Materials will likely need to be removed prior to final project grading and stabilization.
- Use of this BMP may not be applicable to very short duration projects.

Implementation

General

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires that generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather

Installation/Application Criteria

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5%.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15%. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section or one side in the case of a super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered.

- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15%.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (WE-1, Wind Erosion Control).
- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support heaviest vehicles and equipment that will use it.

- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.
- Periodically apply additional aggregate on gravel roads.
- Active dirt construction roads are commonly watered three or more times per day during the dry season.

Costs

Gravel construction roads are moderately expensive, but cost is often balanced by reductions in construction delay. No additional costs for dust control on construction roads should be required above that needed to meet local air quality requirements.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

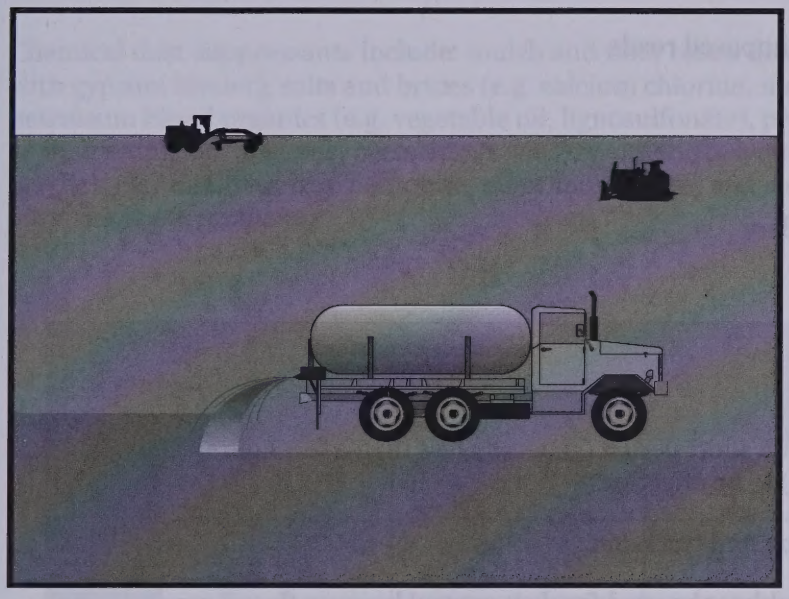
Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	x	x	x	x	x			x
Disturbed Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Clearing/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

APPENDIX G

RESPONSIBLE PARTIES

(Also see Section 6)

Responsible Parties

Title and Contact Information	Area of Responsibility
Legally Responsible Person: Entity Name: Southern California Edison Contact Person: TBD Address: 14005 South Benson Avenue City, State, Zip: Chino, CA 91710 Telephone Number: Fax: Email:	Property Owner and Permittee under the General Permit
Qualified SWPPP Developer: Company Name: AEI-CASC Consulting QSD Name: Melanie Sotelo, CPESC Address: 18 Technology Drive City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (909) 783-0101, ext 1600 Cell: (909) 853-0313 Email: msotelo@aei-casc.com	Draft the SWPPP and any SWPPP amendments and certify compliance of the SWPPP with the General Permit.
Additional Qualified SWPPP Developer: Company Name: AEI-CASC Consulting QSD Name: Alan Batdorf, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (949) 453-1783 Cell: (949) 648-6695 Fax: (949) 453-1860 Email: abatdorf@aei-casc.com	Draft the SWPPP and any SWPPP amendments and certify compliance of the SWPPP with the General Permit.
Qualified SWPPP Practitioner: Company Name: Southern California Edison QSP Name: John Slayton, CPESC Address: 14005 South Benson Avenue City, State, Zip: Chino, CA, 91710 Telephone Number (including emergency contact number[s]): (310) 990-1745 Fax: Email: john.slayton@sce.com	Implement the SWPPP on a daily basis at the Project, oversee the training of contractors and other personnel undertaking SWPPP-related duties, monitor and direct contractors with SWPPP responsibilities (including those installing or maintaining BMPs), oversee the inspection and monitoring programs, perform inspections or delegate others to do so (see other delegated inspectors below), prepare reports required by the SWPPP for review and certification by the LRP's representative.

Title and Contact Information	Area of Responsibility
SWPPP Inspector(s): Company Name: AEI-CASC Consulting QSP Name: Matt Renaud, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (818) 263-3566 Fax: (949) 453-1860 Email: mrenaud@aei-casc.com	Conduct inspections under the supervision of the QSP.
Alternate SWPPP Inspector(s): Company Name: AEI-CASC Consulting QSP Name: Michael O'Hearn, CESSWI Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (714) 497-7276 Fax: (909) 783-0108 Email: mohearn@aei-casc.com	Conduct inspections under the supervision of the QSP.
Contractor/Subcontractor Company Name: QSD Name: Address: City, State, Zip: Telephone Number (including emergency contact number[s]): Fax: Email:	Install, maintain, and replace erosion and sediment controls.

AMENDMENT NO. 2 TO

SOUTHERN CALIFORNIA EDISON COMPANY

DELEGATION OF SIGNATURE AUTHORITY

TRANSMISSION AND DISTRIBUTION

WHEREAS, effective November 25, 2009, James A. Kelly, Senior Vice President ("the Responsible Officer") and Stephen E. Pickett, Senior Vice President and General Counsel of Southern California Edison Company (the "Company") executed a Delegation of Authority and accompanying matrix (The "Matrix") most recently amended on May 3, 2010 (collectively, the "Delegation of Signature Authority"), designating certain employees of the Company the authority to execute and deliver on behalf of the Company certain contracts and other instruments specified in the Matrix, in each case subject to the monetary and other limitations specified in the Matrix.[1,2]

WHEREAS, the Responsible Officer deems it necessary to amend and entirely restate the Matrix as described on the attached Exhibit A.

NOW, THEREFORE, the Matrix shall be amended and entirely restated as described on the attached Exhibit A.

FURTHER, except as otherwise hereby amended, the Delegation of Authority Resolution shall remain in full force and effect. The Delegation of Signature Authority may be amended from time to time, in whole or in part, by a writing executed by the parties then holding the titles of the signatories below. The Delegation of Signature Authority, this Amendment and all further amendments to the Delegation of Signature Authority shall expire on December 31, 2010.

Date: 9/2/10

James A. Kelly
Senior Vice President

Approved:

Date: 9/3/10

Stephen E. Pickett
Senior Vice President and General Counsel
Attachment

1 Signature authority of SCE elected Vice Presidents is derived from the SCE Bylaws and not from this delegation. Consequently, any limitation on an officer's authority pursuant to this delegation is governed by internal company policy and would likely have no legal effect on outside parties.

2 To determine authority to sign documentation related to the settlement of any claim for or against SCE, or related to the prosecution or defense of any Small Claims Court litigation on SCE's behalf, see SCE Board Resolution "Authorization of Settlement of Claims," adopted on September 7, 2006.

SCE Transmission and Distribution
Signature Authorization Matrix and Supplementary Approval Guidelines
Pursuant to SCE Board Resolution "Delegations of Signature Authority"

Adopted on September 3, 2009[3]
As of August 23, 2010

EXHIBIT A

SAP PAYMENT AUTHORIZATIONS[4]

PROCUREMENT-PREQS & CHANGE ORDERS AUTHORIZATION LEVEL							
8	7	6	5	4	3	2	1
Unlimited	≤$2M	≤$1M	≤$500K	≤$250K	≤$100K	≤$25K	≤$5K
Bus Unit Sr. VP & VPs[5]	Director	MGR 2-3, MPP2-3, Construction Project Manager	SUP4, ENG5, TSP4, MGR1, ENG4, MPC3, MPP1	SUP3, TSP3, ENG3, MPC2	SUP1-2, APP2, TSP2	SES, Corporate Repr 3, CCM3, MPC1, PLA2, Planner-Power Systems 4	Admin. Support[6] Reporting to an M3 or Above

NON-PO PAYMENT AUTHORIZATIONS[7] AUTHORIZATION LEVEL							
8	7	6	5	4	3	2	1
Unlimited	≤$25M	≤$5M	≤$2M	≤$500K	≤$100K	≤$25K	≤$5K
Bus Unit Sr. VP & VPs[5]	Upon SCE Risk Management Committee Review & Approval	Upon SCE Risk Management Committee Review & Approval		Director	MGR3, Construction Project Manager	MGR2, MPP2	ENG4-5, MGR1, MPC2-3, MPP1, SUP2-4

3 To determine authority to sign documentation related to the settlement of any claim for or against SCE, or related to the prosecution or defense of any Small Claims Court litigation on SCE's behalf, see SCE Board Resolution "Authorization of Settlement of Claims," adopted on September 7, 2006.

4 Signature authority for SAP Purchase Requisitions (PREQ), Change Order, and Non Purchase Order (NPO) payment authorizations are approved in SAP via the Position Change Request Form (PCRF). An up-to-date list of authorized position numbers in SAP can be generated by running SAP transaction code ZHRAUDIT.

5 Signature authority of SCE elected Vice Presidents derives from SCE's by-laws and not from this delegation form.

6 In accordance with segregation of duty guidelines, PREQ maintainer and PREQ approver roles will not be granted to the employee concurrently.

7 Exceptions to the Non-PO payment authorization levels are named on Attachment 1.

CONTRACTS & OTHER INSTRUMENTS[8]

ADVANCED TECHNOLOGY				
Description	**Bus Unit Sr. VP/ VP**	**Director**	**MGR3**	**MGR2**
Confidentiality / Non-Disclosure Agreements	X	X		
Trial Use Agreements	X	X	X	
Agreements / Contracts to provide testing, research studies or engineering services to outside 3rd parties (e.g. DOE, CEC)	Unlimited	<$500K	<$100K	
EPRI Project/Program Agreements	Unlimited	<$500K	<$100K	<$25K
SCE Sponsored Hotel/Catering/Event Agreements/Contracts	Unlimited	<$500K	<$100K	<$25K

ENGINEERING & TECHNICAL SERVICES				
Description	**Bus Unit Sr. VP/ VP**	**Director**	**MGR3**	**MGR2**
Supplier Technical Qualification Letter				X
Applicant Financed and SCE Financed Added Facilities Agreements				X
Construction Project Storm Water Pollution Plan Permit Registration	X	X		X

[8] Signature authority for contracts and other instruments is delegated only to the specific employees named on Attachment 2.

APPENDIX H

CONTRACTORS AND SUBCONTRACTORS

CONTRACTORS AND SUBCONTRACTORS

Contractor/Subcontractor Name and Address	Contact Person/ Phone Number	Activity	Start Date	End Date
TBD				

APPENDIX I

TRAINING REPORTING FORM

Trained Contractor Personnel Log

Storm Water Management Training Log

Project Name: SCE – **Ivanpah Material Storage Yard**

Storm Water Management Topic: (check as appropriate)

- ❑ Erosion Control
- ❑ Sediment Control
- ❑ Wind Erosion Control
- ❑ Tracking Control
- ❑ Non-storm water management
- ❑ Waste Management and Materials Pollution Control
- ❑ Storm Water Sampling

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours):

Attendee Roster

(Attach additional forms if necessary)

Name	Company	Phone

COMMENTS:

Trained Contractor Personnel Log

(Insert any documentation of training here.)

Date	Training Type (ex. formal class, tailgate session, video)	Training Duration	Attendees

Note: Attach copies of sign-in sheets or other documentation of training (certificates, materials presented, agenda, etc.)

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Melanie Sotelo

December 16, 2010 – December 16, 2012

Certificate # 00225

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

John Slayton

December 10, 2010 – December 10, 2012

Certificate # 00229

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Alan Batdorf

January 11, 2011 – January 11, 2013

Certificate # 00221

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

The CPESC® Application Review Committee
certifies that

Matthew M. Renaud

Subscribes to the Code of Conduct and Ethics and has met the requirements established by the CPESC Council as a

Certified Professional in Erosion and Sediment Control™

An EnviroCert International, Inc. Program

Certification Number: 6156

Certification Date: December 14, 2010

Donald W Lake Jr.
Chair, CPESC Council

Gina Burleson
CPESC Program Manager

The CPESC Program was established in 1982.

The CESSWI™ Application Review Committee
certifies that

Michael William O'Hearn

Subscribes to the Code of Conduct and Ethics and has met the requirements established by the CESSWI Council as a

Certified Erosion, Sediment and Storm Water Inspector™

An EnviroCert International, Inc. Program

Certification Number: 1024

Certification Date: July 1, 2010

Susan L Clevbe
Chair, CESSWI Council

Glenda Caumsey
CESSWI Program Manager

The CESSWI Program was established in 2007.

APPENDIX J

MONITORING AND REPORTING PROGRAM RECORDS:

1. Construction Site Inspection Checklist
2. Stormwater Monitoring and Reporting Form
3. Visual Inspection Field Log Sheet
4. Pollutant Testing Guidance Table

SCE:

IVANPAH MATERIAL STORAGE YARD FORMS

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Temporary Erosion Controls				
Does the applied erosion control provide 100% coverage for the required areas?				
Are there any non-vegetated areas that need erosion control?				
Is the area where erosion control is required free from visible erosion?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, or mulching?				
Are there any areas of the site that are disturbed, but will likely lie dormant for over 14 days?				
Do any erosion control BMPs require maintenance?				
Temporary Sediment Controls				
Are temporary sediment controls functional, maintained properly, and installed in accordance with the details and/or the SWPPP Map?				
If not, do any sediment control BMPs require maintenance?				
Are temporary sediment controls free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced according to the SWPPP Map?				
Are fiber rolls installed and maintained on required slopes in accordance with the details, functional and maintained?				
Are silt fences placed on level contours?				
Storm Drain Inlet Protection				
Are storm drain inlet BMPs internal to the project installed and maintained properly, according to the storm drain inlet BMP Fact Sheet located in the SWPPP report?				
Similarly, are offsite storm drain inlet BMPs installed and maintained properly?				
Stockpiles				
Are stockpiles covered and protected from run-on, run-off from adjacent areas, and from winds?				
Are stockpiles covered and located at least 50 feet from concentrated flows, downstream drainage courses and storm drain inlets?				
Have soil stockpiles that will sit for over 14 days been stabilized?				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Tracking Control				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Does the project have a stabilized construction site entrance/exit and is it installed correctly according to the SWPPP?				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed according to the SWPPP?				
Wind Erosion Control				
Is dust control implemented?				
Dewatering Operations				
Is dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 50 feet away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Waste Management & Materials Pollution Control				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 50 feet from concentrated flows and downstream drainage facilities?				
Are material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and water tight?				
Do temporary concrete washout facilities prevent concrete residues from entering the drainage system?				
Are the temporary concrete washout facilities' liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters with lids?				
Are trash receptacles provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Are waste management receptacles free of leaks?				
Is the site free of litter?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Are portable toilets placed within containment to prevent the discharge (leaking) of pollutants?				
Spill Control and Response				
Are there proper spill clean-up materials, and posted spill-reporting procedures for hazardous materials and wastes in open and accessible locations adjacent to storage areas?				
If a spill has occurred, was the Environmental Specialist contacted within 24 hours of a spill of a hazardous substance?				
Non-Storm Water Discharges				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Environmental Specialist been notified?				
If there has been an unauthorized or non-storm water discharge, has it been immediately contained, cleaned up and documented in the SWPPP?				
Are there any other potential non-storm water pollution control concerns at the site?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Discharge Points				
Are discharge points and discharge flows free from noticeable pollutants?				
Are discharge points free of any significant erosion and deposition?				
SWPPP Update				
Does the SWPPP adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown in the SWPPP Map also installed on the construction site?				
Is the SWPPP on-site where it is accessible to others?				
Is the NOI posted on-site?				
Does the SWPPP contain a current list of potential pollutant sources?				
General				
Was a Rain Even Action Plan (REAP) developed since the last inspection?				
Are there any other potential water pollution control concerns at the site?				
Storm Water Monitoring				
Is there a 50% chance of rain or greater in the forecast? (http://www.wrh.noaa.gov) Note: Print and attach NOAA forecast to this checklist.				
If this is a post-storm inspection, did the storm event produce precipitation of 0.5 inch or more?				
Are there any noticeable odors or visible sheen on the surface of any runoff or discharges?				

STORM WATER MONITORING AND REPORTING				
Parameter	**Date**	**Time**	**Location**	**Result**

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Risk Level 1
Visual Inspection Field Log Sheet

Date and Time of Inspection:				Report Date:		
Inspection Type:	□ Weekly	□ Before predicted rain	□ During rain event	□ Following qualifying rain event	□ Contained stormwater release	□ Quarterly non-stormwater

Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations

Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate storm beginning: _____ (date and time)	Estimate storm duration:_____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes identify location		
Odors	Yes □	No □
Floating material	Yes □	No □
Suspended Material	Yes □	No □
Sheen	Yes □	No □
Discolorations	Yes □	No □
Turbidity	Yes □	No □

Site Inspections

Outfalls or BMPs Evaluated	Deficiencies Noted
(see attached detailed **Construction Site Inspection Checklists**)	

Was water quality sampling part of this inspection?	❒ Yes	❒ No

If YES, see the results on the final page of the inspection form.

Photos Taken:	Yes □	No □	Photo Reference IDs:

Corrective Actions identified to bring the site into compliance (note if SWPPP needs to be modified)

"I certify that this inspection form is true, accurate, and complete, to the best of my knowledge and belief."

Inspector Name:	Inspector Title:
Signature:	Date:

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Sampling Field Log Sheet for Non-Visible Pollutants

Construction Site Name:	Date:	Time Start:
Sampler:		
Sampling Event Type:	□ Non-visible pollutant □ Other_____	

Field Meter Calibration

pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements

Location Description	pH	Turbidity	Time

Grab Samples Collected

Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Asphalt Products	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes– Black, solid material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter Acidity Test Kit	EPA 150.1 (pH) SM 2310B (Acidity) EPA 300.0 (Anion)
	Bleaches	No	Residual Chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	Phosphate	Phosphate	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Portland Concrete Cement and Masonry Products	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	**pH**	pH Meter	EPA 150.1 (pH)
			Alkalinity	Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	Methyl Methacrylate	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	Calcium Test	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter	SM 2310B (Acidity)
			Alkalinity	Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
			pH		EPA 150.1 (pH)
			VOC/SVOC		EPA 601/602 or EPA 624 (VOC)/ EPA 625 (SVOC)
Landscaping and Other Products	Aluminum Sulfate	No	Aluminum	TDS Meter	EPA 200.8 (Metal)
			TDS	Sulfate	EPA 160.1 (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	Sulfate	Sulfate	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic [4]	No	Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Phosphate	Phosphate	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	EPA 351.3 (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers-Organic	No	TOC	Nitrate	EPA 415.1 (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		EPA 351.3 (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required		
	Herbicide	No	Herbicide	None	Check lab for specific herbicide or

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Pesticide		**Pesticide**		pesticide
	Lime		Alkalinity	pH Meter Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
Painting Products	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	COD	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	COD	None	EPA 410.4 (COD)
	Solvents	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable - No Testing Required		
Contaminated Soil [5]	Aerially Deposited Lead [3]	No	Lead	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
	Other	No	Contaminant Specific	Contaminant Specific	Contaminant Specific
Line Flushing Products	Chlorinated Water	No	Total chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
Adhesives	Adhesives	No	COD	None	EPA 410.4 (COD)
			Phenols	Phenol	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)
Dust Palliative Products	Salts (Magnesium Chloride, Calcium Chloride, and Natural Brines)	No	Chloride	Chloride	EPA 300.0 (Chloride)
			TDS	TDS Meter	EPA 160.1 (TDS)
			Cations (Sodium, Magnesium, Calcium)	None	EPA 200.7 (Cations)
Vehicle	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid	Visually Observable - No Testing Required		

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
	Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
Soil Amendment/ Stabilization Products	Polymer/Copolymer [6,7]	No	Organic Nitrogen	None	EPA 351.3 (TKN)
			BOD	None	EPA 405.1 (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	EPA 415.1 (DOC)
			Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes - Solids	Visually Observable - No Testing Required		
	Lignin Sulfonate	No	Alkalinity	Alkalinity	SM 2320 (Alkalinity)
			TDS	TDS Meter	EPA 160.1 (TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
			Nickel		EPA 200.8 (Metal)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Gypsum	No	pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Calcium	Calcium	EPA 200.7 (Calcium)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
			Manganese		
			Vanadium		
Treated Wood Products	Ammoniacal-Copper-Zinc-Arsenate (ACZA) Copper-Chromium-Arsenic (CCA) Ammoniacal-Copper-Arsenate (ACA) Copper Naphthenate	No	Arsenic	Total Chromium	EPA 200.8 (Metal)
			Total Chromium		
			Copper		
			Zinc		
	Creosote	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		

Notes:

1. If specific pollutant is known, analyze only for that specific pollutant. See MSDS to verify.
2. For each construction material, test for one of the pollutant indicators. Bolded pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.ysi.com and www.chemetrics.com for some of the test kits
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the contract documents for aerially deposited lead (ADL)
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by the State of California Department of Transportation (Caltrans), the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is **not** required: Super Tak™, M-Binder™, Fish Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

Eldorado-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan
Telecommunication Linear Construction Activities

Eldorado-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan
Telecommunication Linear Construction Activities

SOUTHERN CALIFORNIA EDISON®

An *EDISON INTERNATIONAL®* Company

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
PER
CALIFORNIA 2009-0009-DWQ, Amended by 2010-0014 DWQ
FOR

ELDORADO-IVANPAH TRANSMISSION PROJECT (EITP)
TELECOMMUNICATION LINEAR CONSTRUCTION ACTIVITIES

Nipton and Ivanpah

CA 92364

LUP Type 1

Qualified SWPPP Developer (QSD)

AEI CASC CONSULTING

Melanie Sotelo, CPESC
Project Manager
18 Technology Drive, Suite 135
Irvine, CA 92618
(909) 783-0101 Ext. 1600

Date: August 9, 2011

Estimated Construction Dates:

Start Date: 09/01/2011 **Completion Date: 08/31/2012**

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SECTION 1
SWPPP REQUIREMENTS

1.1 Introduction

This SWPPP is written for a project with coverage under **STATE WATER RESOURCES CONTROL BOARD (SWRCB) ORDER NO. 2009-0009-DWQ as amended by 2010-0014-DWQ; GENERAL PERMIT NO. CAS000002** as a Type 1 Project. (See risk assessment analysis in Appendix B.)

Southern California Edison (SCE) shall ensure that this Linear Underground/Overhead Project (LUP) SWPPP is developed and amended or revised by a QSD. This SWPPP is designed to address the following objectives:

1. All pollutants and their sources, including sources of sediment associated with construction activities associated with LUP activity are controlled;
2. All non-storm water discharges are identified and either eliminated, controlled, or treated;
3. BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from LUPs during construction; and
4. Stabilization BMPs installed to reduce or eliminate pollutants after construction is completed are effective and maintained.

1.2 Certifications by Qualified SWPPP Developer

This SWPPP was developed by a Qualified SWPPP Developer (QSD):

AEI-CASC Consulting
Melanie Sotelo
18 Technology Drive, Suite 135
Irvine, CA 92618
(909) 783-0101 Ext. 1600
Qualifications*: CPESC No. 5693, QSD CASQA Registration No. 225

Date: August 9, 2011

QSD Signature: Melanie Sotelo

Print QSD Name: Melanie Sotelo

QSD Title: Project Manager

*Include Qualifications and documentation of training in Appendix I, or stamp cover sheet.

1.2.1 SWPPP Certification by a Legally Responsible Person (LRP)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Date: 9/12/11

Contact Signature:

Owner Name: Don Johnson

Owner Title: Manager 3, TDBU Major Projects Organization

1.2.2 Permit Registration Documents (PRDs)

To obtain coverage under the General Permit, dischargers are required to electronically file PRDs which includes a Notice of Intent (NOI), Risk Assessment, Site Map, Storm Water Pollution Prevention Plan, and Signed Certification Statement. In addition to electronically filed PRDs, the appropriate Annual permit fees shall be mailed to the SWRCB.

PRDs have been submitted to the SWRCB via the Stormwater Multiple Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP). Refer to Appendix B for a copy of the Project PRDs and Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP Availability and Implementation

The General Permit (Section XIV.C) requires the SWPPP be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and site map will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone. **The SWPPP shall be implemented concurrently with the start of ground disturbing activities.**

1.4 SWPPP Amendments

The General Permit (Section VII.B.6) requires that this SWPPP be modified and amended to reflect any changes in construction or operations that may affect the discharge of pollutants from the construction site to surface waters, ground waters, or the municipal separate storm sewer system (MS4). The SWPPP will also be amended if it is in violation of any condition of the Permit or has not achieved the general objective of reducing pollutants in storm water discharges. SWPPP Amendments will be prepared by a Qualified SWPPP Developer (QSD). The QSP shall notify the LRP or the QSD if an amendment to the SWPPP is required. SWPPP Amendments will be dated, signed by the QSD, and directly attached to the SWPPP. Refer to Appendix C, for the SWPPP Amendment Log and corresponding Amendment Documents.

1.5 Retention of Records

The General Permit (Sections I.J.69 and IV.G) requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed. SCE shall furnish the RWQCB, SWRCB, or US Environmental Protection Agency (EPA), within a reasonable time, any requested information to determine compliance with this General Permit. Records shall be retained for a minimum of three years for the following items:

- Site inspections
- Compliance certifications
- Discharge reports
- Approved SWPPP document and amendments

1.6 Required Non-Compliance Reporting

The General Permit (Section I.J.) identifies several areas of non-compliance reporting. It is the responsibility of SCE to properly document reportable discharges or other violations of the General Permit. Exceedances and violations will be reported using the SMARTS system and include the following:

- Self-reporting of any other discharge violations or to comply with RWQCB enforcement actions; and
- Discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR §§ 117.3 and 302.4, and those defined by California regulation or statute, unless a separate NPDES Permit has been issued to regulate those discharges.

If an illegal discharge occurs or if the project receives a written notice or order from any regulatory agency, the QSP will immediately notify the TDBU E-SES and LRP, and will file a written report to the SCE-TDBU SWPPP Coordinator within 7 days of the discharge event, notice, or order, and the LRP will file compliance documentation as required per the General Permit, to the Regional Water Quality Control Board (RWQCB) via the SMARTS system. Corrective measures will be implemented immediately following the discharge, notice, or order. The report will contain the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge, including the cause or nature of the notice or order;
- The control measures (BMPs) deployed before the discharge event, or prior to receiving notice or order;
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence; and
- An implementation and maintenance schedule for any affected BMPs.

1.7 Annual Report

SCE is responsible for preparing, certifying, and electronically submitting an Annual Report for this Project if it remains under General Permit coverage for at least 3 months. The Annual Report shall be filed prior to submitting a Notice of Termination (NOT) for this Project, but no later than September 1st of each year. Reporting requirements are identified in Section XVI of the General Permit and include providing a summary of the following:

1. A summary and evaluation of all sampling and analysis results, including copies of laboratory reports.
2. The analytical method(s), method report unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").
3. A summary of all corrective actions taken during the compliance year.
4. Identification of any compliance activities or corrective actions that were not implemented.
5. A summary of all violations of the General Permit.

6. The names of individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements.
7. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including any required precipitation (rain gauge) recordings.
8. Documentation of all training for individuals responsible for all activities associated with compliance with this General Permit.
9. Documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair.
10. Documentation of all training for individuals responsible for overseeing, revising, and amending the SWPPP.

1.8 Changes to Permit Coverage

The General Permit (Section II.C) includes provisions allowing the revision of total acreage covered by the General Permit when a portion of the site is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the site is sold to a different entity; or when new acreage, subject to the General Permit, is added to the site.

Within 30 days of a reduction or increase in total disturbed acreage, SCE will electronically file revisions of PRDs that include a certified Change of Information (COI), revised site map, SWPPP revisions, as appropriate, and, if applicable, certification that new landowners have been notified of applicable requirements to obtain permit coverage (including name, address, phone number, and e-mail address of new landowner) in accordance with requirements of the General Permit. Refer to Appendix C for the SWPPP Amendment Log and PRD changes.

1.9 Notice of Termination

Prior to submitting a Notice of Termination (NOT) an annual report must be submitted (see Section 1.7). Within 90 days of when construction is complete or ownership has been transferred, SCE shall electronically file an NOT, a final site map, and photos via SMARTS, to terminate coverage under the General Permit. Construction is considered complete only when all portions of the site have been transferred to a new owner, or all of the following conditions are met:

- The site will not pose any additional sediment discharge risk than it did prior to construction activity;
- There is no potential for construction-related storm water pollutants to be discharged into site runoff;
- Final stabilization has been reached;
- Construction materials and wastes have been disposed of properly.

Final Stabilization for the purposes of submitting an NOT is satisfied for this Project, when all soil disturbing activities are completed and one of the following criteria is met:

- 70% final cover method (photos required; no computational proof required); or
- RUSLE/RUSLE2 method (computational proof required); or
- Custom method (discharger demonstrates that site complies with final stabilization).

SECTION 2
PROJECT SITE INFORMATION

2.1 Project Overview

The Southern California Edison (SCE) Telecommunication Linear Construction Activities (Project) is a component of an overall larger project: The Eldorado-Ivanpah Transmission Project (EITP), a Linear Underground/Overhead Project. This SWPPP describes the storm water best management practices to be implemented for SCE's California telecommunication construction activities and is being developed separately because of geographical locations and construction phasing, as well as different contractors associated with the EITP. The EITP traverses two states (California and Nevada) and the construction activities include transmission upgrades and associated transmission infrastructure submitted by SCE to the California Public Utilities Commission (CPUC) and the Bureau of Land Management (BLM). SCE proposes to construct, operate, and maintain new and upgraded transmission facilities to deliver electricity from several solar energy facilities proposed to be built in the Ivanpah Valley area. The upgraded transmission lines would extend approximately 35 miles from southern Clark County, Nevada, to northeastern San Bernardino County, California. Approximately 28 miles of the EITP are in Nevada, with the remaining 7 miles in California.

2.1.1 Project Linear Activities

The Project is within the jurisdiction of Lahontan Regional Water Quality Control Board (6-South), San Bernardino County, and covers one area north of Interstate 15 near the town of Ivanpah, and another area located south of Interstate 15 near the town of Nipton. The approximate location of the northerly portion is latitude 35.546946° and longitude -115.470473°, and the southerly portion is latitude 35.472002° and longitude -115.248186°

The main construction activities associated with this Project include potential vegetation clearing operations, utility duct trenching and installation of optical ground wire (OPGW), tie-in to existing lines, installation and tie-in of a proposed microwave tower, and soil compaction and stabilization.

Trenching at Nipton begins at the California-Nevada Border and proceeds westerly along the north shoulder of Highway 164, 3-feet off of the existing AC pavement shoulder. From there, trenching proceeds westerly for approximately 2.5 miles, and then turns northerly along an existing dirt road for approximately 1.5 miles to the proposed microwave tower location.

Trenching at Ivanpah begins at a tie-in location to the existing 115KV line of the Eldorado-Baker-Cool Water- Dunn Siding- Mountain Pass line and proceeds northeasterly for approximately 1 mile to the proposed Ivanpah Substation location.

This Project will utilize the Nipton and Ivanpah Material Storage Yards being constructed for this Project under separate Permit coverage (see Section 3.2.1). All topsoil salvage, storage and protection shall be performed per specifications shown in Appendix K. Total disturbed area for this Project is estimated to be approximately 1 acre.

2.1.2 Vicinity Map

Refer to Appendix B for Project Vicinity Map.

2.2 Project Flows

Generally, the Project area's terrain is relatively flat with a slight gradual slope, and will remain unchanged by this Project. For the northerly portion of the Project, the existing flows move across the site in an easterly direction for approximately 7 miles before ultimately discharging to Ivanpah Lake, which is an existing dry lake bed. The southerly portion of the Project's existing flows move across the site in a westerly direction for approximately 5 miles before ultimately discharging to Ivanpah Lake. Ivanpah Lake is not listed on the 2010 303(d) list and has no established TMDLs. The Project is not located in an environmentally sensitive area.

2.2.1 Storm Water Run-On from Offsite Areas

During construction activities, flows will be either intercepted and/or redirected around active construction areas and then allowed to continue along their existing path of travel. BMPs selected to control run-on from discharging sediment on the construction site are described in Section 3.5.2.

2.3 Linear Project Type Assessment

The method used to determine Linear Utility Project (LUP) Type was based on the flowchart of Attachment A.1 located in the Construction General Permit; see Attachment B.2 of the SWPPP. The Project consists of three Type 1 LUP segments; all segments have the following characteristics and requirements:

- Less than 70% of construction will occur on paved surfaces;
- Greater than 30% of the soil disturbance will occur on unpaved surfaces;
- When required, adequate temporary stabilization BMPs will be installed and maintained until vegetation is established to meet the Permit's minimum requirements for final stabilization;
- Disturbed areas will be returned to preconstruction conditions (or equivalent) at the end of the day; and
- The Project areas are not located within a sediment sensitive watershed.

Based on these results, the Segment Sediment Risk for all three segments was determined to be "low", with a "low" Receiving Water's Risk associated with this Project. Therefore, this Project qualifies as a **Type 1 LUP.**

2.4 Construction Schedule

A project schedule has been developed and is provided below. BMP deployment will begin concurrently with ground disturbance activities. The schedule includes the following:

- Estimated Project Construction Start Date: 9/01/11
- Estimated Project Construction Completion Date: 08/31/12

2.5 Potential Construction Site Pollutant Sources

SCE will utilize the control practices identified for each activity that are identified in Section 3 and on the Site Map to minimize or eliminate potential pollutants from discharging from construction areas. The following sections identify potential pollutant sources associated with the Project.

Appendix F includes a copy of the fact sheets of all the BMP's selected for this Project. Implementation and location of BMPs are shown on the Site Map in Appendix B. Narrative descriptions of BMPs which will be used during the overall Project are listed by category in Section 3 of this SWPPP.

2.5.1 Construction Materials

The following is a list of construction materials that may be used which may have the potential to contribute to pollutants in storm water discharges:

- Vehicle fluids, including oil, grease, petroleum, and coolants
- Cement materials associated with concrete operations (if necessary)
- Base and sub base material (may include electrical wiring)
- Concrete curing compounds (if necessary)
- BMP materials
- Treated lumber (materials and waste)
- PCC rubble
- General litter
- Wood products
- Metals and plated products
- Fertilizer, herbicides and pesticides (if necessary)

2.5.2 Construction Wastes

The following is a list of solid or construction wastes that may be created which may have the potential to contribute to pollutants in storm water discharges:

- Solid waste generated from removal of bushes or vegetation
- Packaging materials including wood, paper and plastic
- Scrap metals
- Plastic
- Food wastes
- Timber
- Steel
- Electrical cuttings
- Non-hazardous equipment parts
- Styrofoam
- Hazardous wastes
- Concrete wastes

2.5.3 Construction Activities

The following is a list of construction activities that may be performed which may have the potential to contribute to sediment in storm water discharges:

- Rough grading/clearing operations
- Stockpiling
- Dry utility installations
- Utility excavation operations
- Wiring
- Concrete placement operations related to utility placement (if needed)
- Vehicle and equipment maintenance operations

2.5.4 Other Pollutants Sources

Table 2-3
Construction Activity and Associated Pollutants

[illegible]		[illegible]	[illegible]
Soil Disturbance:			
☒	Rough grading/Clearing	Sediment and organics	Cloudy to opaque
☒	Remove and Recompact	Sediment	Cloudy to opaque
☐	Fine Grading	Sediment	Cloudy to opaque
☒	Trenching	Sediment	Cloudy to opaque
☒	Stockpiling	Sediment	Cloudy to opaque
Asphalt:			
☐	Street Construction	Hydrocarbons	Oily sheen
☐	Street Improvements	Hydrocarbons	Oily sheen
☐	Street Demolition	Hydrocarbons	Oily sheen
Concrete Laden Liquid:			
☐	Curb & Gutter	pH	Cloudy to milky
☐	Sidewalks	pH	Cloudy to milky
☒	Foundations/utility installations	pH	Cloudy to milky
☐	Driveways	pH	Cloudy to milky
☐	Medians	pH	Cloudy to milky
☐	Stuccoing	pH	Cloudy to milky
☐	Grouting	pH	Cloudy to milky
☒	Washouts/Clean up	pH	Cloudy to milky
General:			
☐	Framing	Sawdust	Yes
☐	Painting	Paint (when wet)	Yes
☐	Dry Walling	Gypsum/Joint Compound	Yes
☐	Tiling	Ceramic dust	Yes
☐	Cabinet Building/Installing	Sawdust	Yes

☐	Plumbing	PVC Glue (when wet)/Plastic	Yes
☒	Wiring/Electrical Utilities	Copper/Plastic/Metals	Yes
☐	Heating/Air Conditioning	Sheet metal/fiberglass wool	Yes
☒	Landscaping/soil stabilization	Containers/mulch/soil	Yes

Table 2-4
Equipment used During Construction

☒	Backhoe loader(s)	☒	Fork & Rough-terrain lifts (Pettibone)
☒	Water truck(s)	☒	Generator(s)
☐	Scraper(s)	☐	Concrete boom pumps
☒	Loader(s)	☐	Concrete pumps
☒	Bulldozer(s)	☐	Asphalt planer / grinder
☐	Motor-grader	☐	Asphalt paving machine
☐	Excavator(s) / Track hoe(s)	☐	Street striping equipment
☐	Dump trucks (10-wheel)	☒	Building material delivery trucks
☐	Belly/Bottom dumps (tractor/trailer)	☒	Personal cars and light trucks
☐	Tractor: skip loader	☒	Waste hauling trucks
☐	Skid steer loaders (Bobcat)	☒	Trencher(s)
☐	Concrete delivery trucks	☐	Stucco/Plaster spray pumps
☒	Portable concrete mixers (if necessary)	☐	Spray paint equipment (airless)
☒	Compaction equipment	☐	Other

Table 2-5
Potential Construction Site Pollutants

	Pollutant Type	Pollutant	Visible Indicator	Typical Location
☒	Diesel Fuel	Petroleum distillates, naphthalene, xylene	Sheen/Stain	Staging areas
☒	Gasoline	Benzene, toluene, xylene, MTBE	Sheen/Stain	Staging areas
☒	Hydraulic Oil	Mineral oil, trace additives	Sheen/Stain	Staging areas
☒	Engine Oil	Mineral oil, additives, combustion byproducts	Sheen/Stain	Staging areas
☒	Transmission Oil	Mineral oil, trace additives	Sheen/Stain	Staging areas
☒	Engine Coolant	Ethylene and propylene glycol, heavy metals	Green/red	Staging areas
☒	Grease	Petroleum hydrocarbons	Sheen/Stain	Staging areas
☐	Kerosene	Petroleum hydrocarbons	Sheen/Stain	Staging areas
☐	Fertilizer/Mulch	Nitrogen, phosphorus	No	Staging areas
☒	Pesticide	Water-insoluble chlorinated hydrocarbons, organophosphates, carbonates, and pyrethrums.	Varies	Staging areas
☒	Herbicide	Chlorinated hydrocarbons, organophosphates	Varies	Staging areas
☐	Soil Amendments		No	Staging areas
☒	Concrete (wet)	Fly ash, heavy metals, Portland cement	White solid	Streets & utilities
☐	Concrete coring slurry	Turbidity and pH	Gray liquid	Building construction & streets
☐	Concrete sawing slurry	Turbidity and pH	Gray liquid	Building construction & streets
☒	Cement	Aluminum calcium iron oxide, calcium sulfate	Gray powder	Staging areas
☐	Drywall joint compound	Pigment, vinyl acetate	White putty	Building construction
☐	Grout	Silica sand, Portland cement	White powder	Block wall & Building construction
☐	Paint	Ethylene glycol, titanium oxide, VOC	Colored liquid	Building construction
☐	Sealers	Diacetone alcohol,		Building construction & Streets
☐	Adhesives	COD/ Phenols/ SVOC	White/yellow	Building construction
☒	Sanitary waste	Human waste	Yes	Staging areas & all construction areas
☒		Animal waste	Yes	All areas
☐	Asphalt	Asphalt fumes, cutback asphalt,	Black material	Streets

	Material Type	Pollutant	Visually Observable	Potential Location
☒	Curing Compounds	Glass Oxide, urea-extended phenol	Creamy white	Staging areas
☒	Waste wash water	Residuals and modifications to pH	Suds, foam, froth	Staging areas
☐	Wood Preservatives	Arsenic, Chromium (Total), Copper, and Zinc	Amber liquid	Building construction
☒	Cleaning Solvents	Perchloroethylene, methylene chloride, TCE	Varies	Staging areas
☒	Sediment	Soil, turbidity, dust	Muddy	Staging areas
☒	Vegetation	Organic matter	Yes	Staging areas
☒	Solid Waste	Floatable and blowable trash and debris	Yes	Staging areas
☐	Tile			Building construction & material storage areas
☐	Historic land use contaminants (if applicable)			

2.6 Identification of Non-Storm Water Discharges

Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, and other discharges not subject to a separate NPDES permit adopted by a Regional Water Board. The discharge of non-storm water is authorized under the following conditions:

1. The discharge does not cause or contribute to a violation of any water quality standard;
2. The discharge does not violate any other provision of the General Permit;
3. The discharge is not prohibited by the applicable Basin Plan;
4. SCE has included and implemented specific BMPs required by this General Permit to prevent or reduce the contact of the non-storm water discharge with construction materials and equipment;
5. The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities or pollutants;
6. SCE reports the sampling information in the Annual Report.

Authorized non-storm water discharges associated with this Project may include the following de-chlorinated sources:

- Water to control dust (obtained from Molycorp).

Refer to Section 3.3 for a description of BMPs selected to address non-storm water discharges.

SECTION 3
BEST MANAGEMENT PRACTICES

3.1 Schedule for BMP Implementation Specific for this Project

Table 3-1
BMP Implementation Schedule

BMP Description	[illegible]
EC-1 Scheduling	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
EC-2 Preservation Of Existing Vegetation	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-2 Material Use	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-3 Stockpile Management	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-4 Spill Prevention and Control	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-5 Solid Waste Management	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-6 Hazardous Waste Management	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-8 Concrete Waste Management	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WM-9 Sanitary/Septic Waste Management	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-1 Water Conservation Practices	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-6 Illicit Connection/Discharge	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization

Table 3-1
BMP Implementation Schedule

NS-7 Potable Water/Irrigation	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-9 Vehicle and Equipment Fueling	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-10 Vehicle and Equipment Maintenance	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-12 Concrete Curing	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
NS-13 Concrete Finishing	☒ Grading and Land Development ☐ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-1 Silt Fence	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-5 Fiber Rolls	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization Landscaping
SE-6 Gravel Bag Berm	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
SE-7 Street Sweeping and Vacuuming	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
TC-1 Stabilized Construction Entrance/Exit	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization
WE-1 Wind Erosion Control	☐ Grading and Land Development ☒ Streets and Utilities ☐ Vertical Construction ☒ Final Landscaping and Site Stabilization

Copies of BMP fact sheets specific to this project are located in Appendix F. The following good housekeeping measures should be implemented onsite for the duration of the project:

1. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and

equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

2. Cover and berm loose stockpiled construction materials that are not actively being used.
3. Store chemicals in water tight containers (with appropriate secondary containment to prevent any spillage and leakage in a completely enclosed storage shed. Implement WM-2.
4. Minimize exposure of construction materials to precipitation.
5. Implement BMPs to prevent of-site tracking of loose construction and landscape materials.
6. Prevent the disposal of rinse or wash waters or materials on impervious site surfaces or into the storm drain.
7. Ensure the containment of sanitary facilities to prevent discharges of pollutants to the storm water drainage system or receiving water.
8. Regularly inspect sanitation facilities and clean or replace them as needed.
9. Cover waste disposal containers at the end of every business day and during rain events.
10. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.
11. Contain and securely protect stockpiled waste materials from wind and rain at all times unless actively being used.
12. Implement procedures to effectively address hazardous and non hazardous spills.
13. Maintain equipment and materials for clean-up of spills on-site. Contain leaks and clean up spills immediately. Properly dispose of all spilled materials.
14. Contain all washouts so that there is no discharge into the underlying soil and onto the surrounding areas.
15. Prevent oil, grease, or fuel from leaking in to the ground storm drains or surface waters.
16. Immediately clean up all leaked material and dispose of properly.
17. Contain stockpiled materials including mulches and topsoil when they are not actively being used.
18. Contain fertilizers and other landscape materials when they are not being actively used.
19. Discontinue the application of any erodible landscape material within two days before a forecasted rain event of during periods of precipitations.
20. Stack erodible landscape materials on pallets and cover when not being used or applied.
21. Implement measures to control all non storm water discharges during construction.
22. Limit washing vehicles on-site to emergency situations only. Prevent non-storm water discharges from vehicle washing from reaching surface waters or the MS4 drainage system.
23. Prevent un-authorized non-storm water discharges from reaching surface waters or the MS4 drainage system when cleaning streets.
24. Implement effective wind erosion control BMPs.

25. Provide soil cover for areas of construction that have been disturbed and are not scheduled to be re-disturbed for at least 14 days and for all finished slopes, open space, utility backfill, and completed lots.
26. Limit the use of plastic materials when more sustainable environmentally friendly alternatives exist.
27. Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to control erosion and sediment discharges from the site.
28. Conduct regular storm water tailgate meetings with the workforce when the project is staffed and work is underway.

3.2 Housekeeping

3.2.1 Construction Materials

An inventory of construction materials and activities is provided in Sections 2.5.1 and 2.5.3, respectively. The Material Storage Yards for this Project will be the Nipton Material Storage Yard located southwest of Nipton Road and Nipton Moore Road, and the Ivanpah Material Storage Yard located at the proposed location of the Ivanpah Substation, south of Coloseum Road and West of Interstate 15. Implementation and locations of some materials handling control BMPs are shown on the Site Map(s) in Appendix B. The BMPs that have been selected to handle material controls on the construction site areas are:

- **WM-2 Material Use**

  The Project will utilize the Ivanpah and/or Nipton Material Storage Yard as the primary material storage and usage locations. However, smaller areas of construction material usage may be located at locations along the linear route depending upon current operations and materials being handled. The QSP, or designated personnel, shall update the Site Map to show all locations.

  In general, this BMP will be implemented to help prevent discharges of construction materials during use. SCE will utilize stabilized areas, as necessary, to prevent potential spills and unnecessary tracking of sediment. Spill clean-up materials, material safety data sheets, material inventory, and emergency contact numbers will be maintained and stored onsite by SCE.

- **WM-3 – Stockpile Management**

  This Project will utilize the Ivanpah and/or Nipton Material Storage Yard as the primary location for stockpiles. However, if any field located construction material stockpiles occur outside of the designated Material Storage Yards, this BMP shall be implemented. The QSP, or designated personnel, shall update the WPCDs to show all stockpile locations:

  - Stockpiles should be located away from concentrated flows of storm water and drainage courses.
  - Stockpiles require proper wind erosion control. See WE-1-Wind Erosion Control for specifics of this BMP.
  - All stockpiles shall be covered or protected with perimeter sediment control prior to the onset of precipitation.

3.2.2 Waste Management Controls

An inventory of construction wastes is provided in Section 2.5.2. Implementation and field locations of waste management control BMPs shall be shown on the Site Map in Appendix B. The BMPs that have been selected to handle materials and control construction wastes are:

- **WM-5 – Solid Waste Management**

  SCE shall implement this BMP whenever wastes are generated, stockpiled, or removed from the Project. Due to windy conditions occurring often in the Project area, trash should be collected daily, at a minimum, and placed in waste containers equipped with functional lids, and covered at the end of every business day and during rain events. Implementation of this BMP will minimize storm water contact with waste materials and prevent waste discharges. Solid waste, including rubble stockpiles, should be removed and disposed of weekly at an authorized offsite facility.

- **WM-6 – Hazardous Waste Management**

  SCE shall implement this BMP to prevent or reduce the discharge of hazardous materials to stormwater or watercourses. SCE shall utilize the Project's designated Material Storage Yards for temporary storage, if needed, and shall place hazardous materials in a non-permeable, waterproof spill containment bin and provide training of employees and subcontractors.

- **WM-8 – Concrete Waste Management**

  Project concrete washout facilities shall be located at the Project's designated Material Storage Yards. Washouts shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by any Project washout operations and shall be placed a minimum of 50 feet from existing water courses, and apart from construction traffic areas. A sign shall be installed adjacent to the washout facility to inform concrete equipment operators to utilize the proper facilities.

- **WM-9 – Sanitary/Septic Waste Management**

  SCE shall minimize or eliminate the discharge of construction sanitary/septic wastes. This BMP is applicable to temporary and portable sanitary/septic systems on construction sites and associated areas. Portable toilets will be placed within one or both of the Projects designated Material Storage Yards. Should locations change, or if additional portable toilets are necessary, the QSP, or designated personnel, shall update the Site Map to reflect their location. Weekly maintenance shall be provided and wastes will be properly disposed of at appropriate offsite facilities. The toilets shall be located away from concentrated flow paths and traffic flow.

3.2.3 Vehicle Storage and Maintenance Controls

An inventory of construction activities is provided in Section 2.5.3. Implementation and locations of vehicle storage and maintenance control BMPs will be field located and the Site Map updated to show their respective locations. The BMPs that have been selected to handle vehicle storage and maintenance for the Project are:

- **NS-9 – Vehicle and Equipment Fueling**

  All vehicle and equipment fueling shall be performed in the designated material storage area and this BMP will be utilized to manage any mobile fueling activities which may occur outside of the material storage area, if needed. Fuel trucks, each equipped with absorbent spill clean-up materials, will be used for any mobile fueling elsewhere on the Project. All mobile fueling

operations will be conducted at least 50 ft away from drainage courses and on a level graded area. Drip pans will be used for all mobile fueling.

- **NS-10 – Vehicle and Equipment Maintenance**

  Several types of vehicles and equipment will be used throughout the Project, including trucks and trailers, backhoes, forklifts and generators. All vehicle and equipment maintenance shall be performed in the designated locations within one of the Project's designated Material Storage Yards and this BMP will be utilized to prevent discharges of vehicle fluids during maintenance activities.

  All vehicle maintenance will be conducted at least 50 ft away drainage courses and on a level graded area. SCE will place drip pans, plastic sheeting, or absorbent material under vehicles and equipment while parked overnight, in storage, and when requiring maintenance activities that involve grease, oil, solvents, or other vehicle fluids.

3.2.4 Landscape Materials

No landscape materials are intended for use in construction of this Project.

3.3 Non-Storm Water Management

3.3.1 Non-Storm Water Controls

An inventory of construction activities and potential non-storm water discharges is provided in Sections 2.5.3 and 2.6. Implementation and locations of some non-storm water control BMPs are shown on the Site Map(s) in Appendix B. The BMPs that have been selected to control non-storm water pollution for the Project are:

- **NS-1 – Water Conservation Practices**

  SCE shall use water in a manner, which will not cause erosion or transport pollutants off-site. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

- **NS-6 – Illicit Connection/Discharge**

  SCE shall use this BMP on all construction areas. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found in the construction areas.

- **NS-7 – Potable Water/Irrigation**

  SCE shall implement this BMP whenever potable water or irrigation water discharges occur at, or enter a construction area.

- **NS-12 – Concrete Curing**

  Discharges of stormwater and non-stormwater exposed to concrete curing may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-12, to reduce or eliminate the contamination of stormwater runoff during concrete curing operations.

- **NS-13 – Concrete Finishing**

  Discharges of stormwater and non-stormwater exposed to finishing operations may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-13, to reduce or eliminate the contamination of stormwater runoff during concrete finishing operations.

3.3.2 Vehicle and Equipment Cleaning

Vehicle and equipment cleaning operations are not planned on this Project.

3.3.3 Spill Response

SCE shall implement WM-4, Spill Prevention and Control, and the following measures to address hazardous and non-hazardous spills at the Project site:

- Maintain equipment and spill clean-up materials available on-site, including, but not limited to shovels, brooms, spill absorbent, rags, and proper waste containment (i.e. non-permeable, water proof spill containment bin). Waste materials shall be labeled and disposed of properly in accordance with local, state, and federal requirements.
- Maintain Project-specific material safety data sheets, material inventory, and emergency contact numbers on-site.
- In the event of a leak or spill of hazardous substances used, stored, or generated on-site, implement proper spill clean up procedures to prevent pollutant discharges to storm drain systems. Spills of oil, petroleum products, and substances listed under 40 CFR parts 11, 117, and 302, and sanitary and septic wastes shall be contained and cleaned up immediately.

Also, refer to Attachment F for related BMP guidance factsheets:

- WM-4 – Spill Prevention and Control
- WM-5 – Solid Waste Management
- WM-6 – Hazardous Waste Management
- WM-9 – Sanitary/Septic Waste Management

Note: For this Project, **Patriot Environmental** has been identified, by SCE, as the primary spill clean-up responder, as well as for other waste discharge incidents.

The notification process will be from the person or entity causing or discovering the incident to the SCE–TDBU SWPPP Coordinator, John Slayton, then to the on-call TDBU E-SES (via the SCE operator) and finally to Patriot Environmental. There is always the possibility that Patriot Environmental may get a call directly from any of the preceding, and Patriot Environmental has been requested to take the call, and then to confirm with the on-call E-SES the person making the notification to them.

- John Slayton's Cell Phone Number: 310-990-1745
- TDBU E-SES Contact Number: 626-302-1212 (Ask for On-Duty TDBU Environmental Specialist)
- Patriot Environmental: 800-624-9136 (Dispatch 24 hr. Contact)

3.4 Erosion Controls

Erosion control consists of source control measures that are designed to prevent soil particles from detaching and becoming suspended in storm water runoff. This Project will incorporate, at a minimum, temporary erosion control measures required by the General Permit, and other measures selected by SCE.

- **EC-1 – Scheduling**

  SCE shall reduce the discharge of pollutants to water courses caused by construction activities by scheduling activities in a manner that will limit exposure of disturbed soil to wind, rain, and storm water run-on and runoff.

- **EC-2 – Preservation of Existing Vegetation**

  SCE shall protect and preserve existing vegetation within the Project areas as long as practicable before removing. SCE shall preserve and protect any existing vegetation adjacent to all work areas. The protection and preservation of such vegetation will serve to control erosion and filter out sediment.

Implementation and locations of temporary erosion control BMPs are shown on the Site Map(s) in Appendix B and described in this section. The BMPs that will be implemented to control erosion for this Project are:

3.4.1 Wind Erosion Controls

This Project is located in an area commonly experiencing high winds. At a minimum, the Project shall implement the following BMP to control dust for this Project:

- **WE-1 – Wind Erosion Control**

  This BMP, along with NS-1 – Water Conservation Practices, will be implemented to provide Dust Control and prevent discharges from dust control activities and water supply equipment. Water will be applied to disturbed soil areas of the Project to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Water equipment leaks will be repaired immediately. Water application rates will be minimized, as necessary, to prevent runoff and ponding.

3.4.2 Inactive Areas and Finished Slopes

The Project area is relatively flat and does not include any slopes requiring protection. Construction activities will be scheduled such that any disturbed areas will undergo construction until final stabilization is complete.

3.5 Sediment Controls

Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This Project will incorporate at a minimum, temporary sediment control measures, and other measures selected by SCE.

Implementation and locations of temporary sediment control BMPs are shown on the Site Map in Appendix B. The BMPs that will be implemented to control sediment for the Project are detailed below.

3.5.1 Linear Barriers/Perimeter Controls

Linear barriers for perimeter protection will be applied throughout the Project. The installation of linear barriers will serve as sediment control for exposed soil areas. Linear barriers shall be maintained to provide adequate sediment holding capacity. Linear barriers will be placed across construction phase perimeters. These linear barriers will be placed to prevent sheet flow from running uninterrupted into areas of the Project under active construction. As construction progresses and these Linear Barrier/Perimeter Control BMPs are implemented, altered, removed, and/or no longer required, the Site Map in Appendix B shall be updated.

The following BMPs have been selected to control sediment from discharging from the perimeter of active construction areas, ingress and egress locations, and into natural drainage systems outside of the construction area:

- **SE-1 – Silt Fence**

  Due to high winds commonly experienced in the Project area, use of silt fence is not planned. If it is determined by the QSP, or designated personnel, to be necessary prior to precipitation, proper installation for this BMP is crucial to withstand wind forces that it may encounter. These barriers may be placed according to SE-1 to prevent sheet flow from running uninterrupted into the Project construction area. Sediment shall be removed when it reaches approximately 1/3 of the barrier height. Barriers shall be removed from the site when no longer required.

- **SE-5 – Fiber Rolls**

  Fiber rolls may be placed around the Project's disturbed area perimeters, down-slope of exposed soil areas, and around temporary stockpiles. SCE shall place fiber rolls, as designated on the Site Map, in locations to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from runoff.

  Fiber roll barriers shall be secured (staked) to the ground in a trench depth of 1/4 to 1/3 of the thickness of the roll, and a width of the diameter of the roll. The area behind the fiber rolls will collect and hold runoff in order to allow suspended sediment to settle out. SCE will remove this sediment periodically, and especially after heavy rains. Fiber rolls, which become clogged with sediment, will be replaced as necessary to ensure the free flow of water.

- **SE-6 – Gravel Bag Berm**

  Gravel bag berms may be placed around temporary stockpiles or the site perimeter. These barriers will be used to prevent sheet flow from running uninterrupted into existing drainage systems and to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from runoff.

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- **TC-1 – Stabilized Construction Entrance/Exit**

  This Project is a linear project and the use of a stabilized construction entrance/exit is not feasible for most areas. If the QSP, or designated personnel, determines one to be necessary, proper installation and maintenance shall be per TC-1 and the location shown on the Site Map in Appendix B.

  Construction entrances are stabilized to reduce tracking of sediment as a result of construction traffic. The designated entrances/exits will be graded to prevent runoff from leaving the

construction areas. Stabilization material will be 3 to 6-inch aggregate. The entrances will be flared if placed where it meets an existing road to provide an adequate turning radius. SCE shall limit speed of vehicles to control dust.

- **SE-7 – Sediment Sweeping and Vacuuming**

  SCE will implement sweeping and vacuuming, as necessary to control sediment that is tracked from the Project construction areas onto public roads. This will limit the amount of sediment that may be transported to storm drains or watercourses.

3.5.2 Run-on – Run-off Controls

The following BMP has been selected to control sediment discharge from any potential run-on and runoff flows entering or leaving the construction site:

- **SE-5 – Fiber Roll and SE-6 – Gravel Bag Berm**

  These barriers may be used separately and/or in conjunction with each other to prevent run-on, run-off from running uninterrupted into the construction area to reduce flow velocities and release the runoff as sheet flow, providing removal of sediment from runoff.

3.6 Post-Construction Stormwater Management Measures

This Project is located in San Bernardino County and is not subject to standards of an active Phase I or Phase II Municipal Separate Storm Sewer System (MS4) Permit. This Project would be subject to any runoff reduction requirements of the CGP. However, these requirements do not take effect until September 2, 2012 and, therefore, are not required to be implemented for this Project.

SECTION 4
BMP INSPECTION AND MAINTENANCE

4.1 BMP Inspection and Maintenance

All inspection, maintenance, repair, and sampling activities shall be performed or supervised by a Qualified SWPPP Practitioner (QSP). Refer to Section 6.1.2 for QSP contact information. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment. Site personnel who have received training on SWPPP implementation, BMP inspection and maintenance, and record keeping will be documented on a training log maintained in Appendix I.

4.1.1 Visual Inspections

Inspections for this Project shall be performed as follows:

- Daily Visual
- Rain Inspections:
  - Pre-Rain Event
  - During (24-Hour) Rain Event
  - Post-Rain Event
- Stored or Contained Storm Water Discharge

The purpose of these inspections is to determine if implemented BMPs need maintenance, have failed, or could fail to operate as intended. If deficiencies are identified during BMP inspections, repairs or design changes shall be initiated within 72 hours of identification.

All Inspections shall be documented on the Site Inspection Checklist, provided in Appendix J, and shall remain onsite with the SWPPP at all times.

4.1.2 Qualifying Rain Event Inspections

The QSP shall visually inspect the construction site within two days prior to a predicted qualifying rain event, and within two days after a qualifying rain event. These inspections are only required within normal business hours of the construction site.

According to the General Permit, a qualifying rain event produces ½ inch or more of precipitation within a 48 hour or greater period between events. Weather forecast information shall be obtained from only the National Oceanographic Atmospheric Administration (NOAA) at the following website: http://www.srh.noaa.gov/.

The QSP will record the storm information for all qualifying rain events including the date, place, time of facility inspections, sampling, visual observation (inspections) notes, and/or measurements, including precipitation. Inspections shall be documented on the Visual Inspection Field Log, provided in Appendix J, and shall remain on-site with the SWPPP at all times.

4.1.3 Stored or Contained Storm Water Monitoring Locations

The QSP shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours. Inspections will be documented using the Visual Inspection Field Log, provided in Appendix J, and maintained onsite with the SWPPP.

4.1.4 Maintenance and Repair

The QSP and/or delegated personnel shall begin implementing repairs or design changes to BMPs within 72 hours of identification of BMPs that:

- Need maintenance to operate effectively;
- Have failed; or
- Could fail to operate as intended.

If the problem warrants an amendment (e.g. a new procedure or BMP that needs to be implemented), the QSP shall notify the QSD.

SECTION 5
TRAINING

5.1 Training

Personnel at the site shall receive training appropriate for individual roles and responsibilities on the Project. Appropriate personnel shall receive training on SWPPP implementation, BMP inspection and maintenance, and record keeping.

The training log showing formal and informal training of various personnel is provided in Appendix I. This form shall be used by the SCE QSP to document informal training of onsite personnel, including subcontractor's supervisors, project foremen, laborers, or other staff members.

SECTION 6
RESPONSIBLE PARTIES AND OPERATORS

6.1 Responsible Parties

The following sections provide a description of authorized representatives that have been approved by the LRP to be responsible for SWPPP activities and have been granted authority to sign permit related documents. Refer to Appendix G – Responsible Parties, for a copy of written authorizations.

6.1.1 Qualified SWPPP Developer (QSD)

The SWPPP shall be written, amended, and certified by a Qualified SWPPP Developer. The QSD shall meet the qualifications as specified by section VII.B.1 of the General Permit. Refer to Appendix A for the General Permit.

The Qualified SWPPP Developer that prepared this SWPPP was:

AEI-CASC Consulting
Melanie Sotelo, CPESC No. 5693
Project Manager
QSD/P CASQA Registration No. 225
(909) 783-0101 Ext. 1600

6.1.2 Qualified SWPPP Practitioner (QSP)

The General Permit requires that the personnel assigned to conduct inspections and monitoring is knowledgeable in the principles and practice of erosion and sediment controls. Assigned personnel shall possess the skills to assess the effectiveness of measures selected to control the quality of storm water discharges from the construction activity.

The Qualified SWPPP Practitioner assigned to the Project is:

John Slayton
CHMM REM CPEA
CPESC No. 5955
QSD/P CASQA Registration No. 229
SCE TDBU SWPPP Coordinator
Southern California Edison
(310) 990-1745

The QSP is responsible for non-storm water and storm water visual observations, sampling and analysis, and responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges. The QSP will be available at all times throughout the duration of the Project, duties of QSP include but are not limited to:

- Ensuring full compliance with the SWPPP and the Permit
- Implementing all elements of the SWPPP, including but not limited to:
    - Implementation of prompt and effective erosion and sediment control measures

  - Implementing all non-storm water management, and materials and waste management activities such as monitoring discharges (dewatering, diversion devices)
  - General site clean-up
  - Vehicle and equipment cleaning, fueling and maintenance
  - Spill control
  - Ensuring that no materials other than storm water are discharged in quantities that will have an adverse effect on receiving waters or storm drain systems, etc.
- Daily visual inspections
- Pre-storm inspections
- Post-storm inspections
- Storm event inspections
- Retaining documentation necessary for the preparation of the annual report
- Ensuring elimination of all unauthorized discharges
- The QSP shall be assigned authority by the SCE Project Manager to mobilize crews in order to make immediate repairs to the control measures
- Coordinate with the SCE Project Manager to assure all of the necessary corrections/repairs are made immediately, and that the Project complies with the SWPPP, the Permit and approved plans at all times
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges.

6.2 Contractors List

All Contractors and Subcontractors will be notified of the requirement for storm water management measures during the Project. A list of contractors, subcontractors, and other individuals directed by the QSP will be maintained and included in Appendix H of this SWPPP. If Subcontractors change during the Project, the list will be updated accordingly.

SECTION 7
MONITORING AND REPORTING PROGRAM (M&RP)

This M&RP is a guide for the QSP, and/or qualified personnel supervised by the QSP, for monitoring and sampling procedures and instructions. The QSP is to determine whether BMPs included in the SWPPP are effective, if immediate actions are needed and/or SWPPP revisions are necessary to reduce pollutants in storm water and authorized non-storm water discharges. If revisions are corrections are determined to be necessary, the QSP shall contact the QSD.

7.1 Objectives

SCE has prepared this M&RP prior to the start of the construction project, so that it shall be implemented immediately upon the start of construction. The M&RP shall be implemented at the appropriate level to protect water quality at all times throughout the life of the project.

7.2 Implementation Schedule

SCE has prepared this M&RP prior to the start of the construction project, so that it shall be implemented immediately upon the start of construction. The M&RP shall be implemented at the appropriate level to protect water quality at all times throughout the life of the project.

The M&RP shall be revised when:

- Site conditions or construction activities change such that a change in monitoring is required to comply with the requirements and intent of this General Permit; or
- The Regional Water Board requires SCE to revise its M&RP based on its review of the document. Revisions may include, but not limited to, conducting additional site inspections, submitting reports, and certifications. Revisions shall be submitted via postal mail or electronic e-mail.

7.3 Monitoring and Reporting Requirements

Table 7-1
Summary of Monitoring Requirements for Type 1 LUP

1	X	X	X	X			X
---	---	---
	Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff that is unaffected by the spilled or released material(s).
	Other	RWQCB or TMDLs may require other monitoring.
	Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and storm water containments within two business days prior to each qualifying rain event.
	Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained storm water when discharged.
	During rain inspection	See BMP inspection below
	BMP	Daily (unrecorded) and every 24 hours during extended storm events (recorded).

7.3.1 Inspection Requirements

As per the Permit, specific site inspections are required (see Section 4.1.1) and shall be performed for this Project and such that:

- SCE shall ensure that all inspections are conducted by trained personnel. The name(s) and contact number(s) of the assigned inspection personnel are listed in this SWPPP.
- SCE shall ensure that all visual inspections are conducted daily during working hours and in conjunction with other daily activities in areas where active construction is occurring.
- SCE shall ensure that during storm inspections are conducted at least once each 24-hour period, during extended storm events and are documented (Site Inspection Checklist in Appendix J).
- SCE shall ensure that pre-storm and post-storm inspections are conducted for each qualifying event and documented (Site Inspection Checklist in Appendix J).
- SCE shall ensure that photographs of the site taken before, during, and after storm events are taken during inspections, and submitted through the State Water Board's SMARTS website once every three rain events.
- SCE shall conduct daily visual inspections to verify that:
    - Appropriate BMPs for storm water and non-storm water are being implemented in areas where active construction is occurring (including staging areas);
    - Project excavations are closed with properly protected spoils, and that road surfaces are cleaned of excavated material and construction materials such as chemicals by either removing or storing the material in protective storage containers at the end of every construction day;
    - Land areas disturbed during construction are returned to pre-construction conditions or an equivalent protection is used at the end of each workday to eliminate or minimize erosion and the possible discharge of sediment or other pollutants during a rain event.
- Inspections may be discontinued in non-active construction areas where soil-disturbing activities are completed and final soil stabilization is achieved (e.g., paving is completed, substructures are installed, vegetation meets minimum cover requirements for final stabilization, or other stabilization requirements are met).
- Inspection programs are required where temporary and permanent stabilization BMPs are installed and are to be monitored after active construction is completed. Inspection activities shall continue until adequate permanent stabilization is established and, in areas where re-vegetation is chosen, until minimum vegetative coverage is established per final stabilization criteria.

7.3.2 Inspection Exceptions

SCE is not required to conduct inspections under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled construction hours (e.g., typical hours 0630 – 1530, Monday-Friday)

SCE will document why the inspections were not conducted and include these exceptions into the SWPPP and the Annual Report.

7.4 Non-Visible Pollutant Monitoring Requirements

All linear underground/overhead projects, regardless of type, are required to monitor runoff for non-visible pollutants in the event of a BMP failure, breach, or spill. An area unaffected by the failure, breach, or spill must also be sampled to serve as the basis of comparison.

7.5 Sample Analysis Plan for Non-Visible Pollutant Monitoring

SCE is subject to the following non-visible pollutant monitoring requirements:

- SCE shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would be visually detectable in storm water;
- SCE is not required to sample if one of the conditions described above (e.g., breach or spill) occurs and the site is cleaned of material and pollutants and/or BMPs are implemented prior to the next storm event;
- SCE shall ensure that water samples are large enough to characterize the site conditions;
- SCE shall collect samples at all discharge locations that can be safely accessed;
- SCE shall collect samples during the first two hours of discharge from rain events that occur during business hours which generate runoff;
- SCE shall analyze samples for the non-visible pollutant parameters, if applicable (see the list of parameters identified in Table 2-5 Potential Construction Site Pollutants);
- SCE shall collect a sample of storm water that has not come in contact with the disturbed soil or materials stored or used onsite (uncontaminated sample) for comparison with the discharge sample;
- SCE shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis;
- For laboratory analyses, all sampling sample preservation, and other analyses must be conducted according to test procedures pursuant to 40 C.F.R. Part 136. SCE shall ensure that field samples are collected and analyzed according to manufacturer specifications of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specifications; and
- SCE shall keep all field/or analytical data in the SWPPP document.

7.6 Non-Visible Pollutant Sampling Locations

Locations for the collection of non-visible pollutant sampling are described below.

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use; accessibility for sampling, personnel safety; and other factors in accordance with the applicable requirements in the General Permit. Planned sampling locations are dependent on the current construction activities occurring in the construction areas and locations shall be determined by the QSP and shall be shown on the Site Map prior to sampling. Labeling shall be identified as indicated below.

- Based on the QSP's routine monitoring inspections, sampling will be conducted when it is evident that there is erosion and movement of soil, or a breach, malfunction, or spill has occurred. The sampling location(s) will be field located down gradient of the areas that have come into contact with the pollutant material.
    - The down gradient sample location(s), will be designated as D1, D2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Map at the time the location is identified.
- Up gradient sampling locations will be identified for the collection of an uncontaminated runoff sample (background sample) for comparison with the down gradient samples. The up gradient samples will be analyzed for the same non-visible pollutants as the down gradient samples. The location(s) will be selected so that the runoff sample will not have come in contact with the pollutant material.
    - The up gradient sample location(s), will be designated as U1, U2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Map at the time the location is identified.
- Since there are no known areas of historical contamination at this site, there are no designated sampling locations. If areas of contamination are subsequently discovered during construction activities, the SWPPP will be amended by the QSD.

7.7 Safety

Care must be exercised in selecting representative sampling locations and in sample collection to ensure the safety of the sampling crew(s). Avoid entering a water body for sampling if possible. Potential hazards may include but are not limited to the following in Table 7-2.

Table 7-2
Potential Safety Hazards

Hazard	Safety Precautions
Animals and Plants	Be alert for the presence of snakes, rodents, insects, and poisonous plants and avoid contact. Long pants are recommended for all field crews.
Construction Operations	Follow construction site safety protocols. Be aware of trip and slip hazards and confirm activities before entering constructions zones. Obey all caution and danger signage.
Lifting heavy objects	Use proper lifting techniques.
Rough terrain	Wear boots with non-slip soles. Use appropriate caution when walking in rough terrain. Two person-sampling crews are recommended when working from or descending steep banks where the water is greater than knee deep.
Weather	Observe weather conditions, avoid lightening strike prone features, wear appropriate clothing, and be aware of flash flood dangers.
Reagents, preservatives	Wear appropriate personal protective equipment (PPE) when using reagents or preservatives.

7.8 Sampling Schedule

Samples for the applicable non-visible pollutant(s) will be collected from the discharge along with a sufficiently large uncontaminated background sample. Samples shall be collected during the first two hours of discharge from rain events, during business hours, and which generate runoff. Typical construction hours are 0630 – 1530, Monday – Friday).

7.8.1 Sampling Personnel

Samples on the Project site will be collected by the following AEI-CASC sampling personnel:

Name/Telephone Number: Matt Renaud, CPESC (818) 263-3566

Name/Telephone Number: Michael O'Hearn, CESSWI (714) 497-7276

Alternate(s)/Telephone Number: _____

Alternate(s)/Telephone Number: _____

All sampling personnel and alternates will review the M&RP, described herein for the qualifications of designated contractor personnel describing environmental sampling training and experience as provided in Appendix I.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the Project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come in contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule described above.

Supplies maintained at the Project site will include, but are not limited to, surgical gloves, sample collection equipment (bailers, etc.), coolers, appropriate number and volume of sample bottles, identification labels, resealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms.

AEI-CASC will obtain and maintain the field-testing instruments, as described under Sample Analysis, for analyzing samples in the field by contractor sampling personnel.

Safety practices for sample collection will be in accordance with AEI-CASC Consulting's ***Health and Safety Plan, August 2007***.

7.8.2 Analytical Constituents

Table 7-3 lists the sources of and types of potential non-visible pollutants on the Project and the applicable water quality indicator parameter(s) for that pollutant. Refer to Appendix J for The Construction Material and Pollutant Testing Guidance Table - Non-Visible Pollutants, which contains a partial list of additional common sources of non-visible pollutants.

Table 7-3
Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Vehicle batteries	Sulfate or pH	Sulfuric acid or pH
Cleaning products	Acids/ Bleaches/ Solvents	pH/ chlorine/ VOC, SVOC

Table 7-3
Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Masonry products	pH, Alkalinity	pH, Alkalinity
Adhesives	Adhesives	COD/ Phenols/ SVOC
Vehicle	Batteries	Sulfuric Acid, Lead, pH
Treated wood products	ACZA, CCA, ACA, Copper Naphthenate	Arsenic, Chromium (Total), Copper, and Zinc

7.8.3 Sample Collection Procedures

Samples of discharge will be collected at the designated sampling locations described in 7.6 and as shown on the Site Map in Appendix B for locations of observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples will be collected and preserved in accordance with the methods identified in Table 7-5. Only personnel trained in proper water quality sampling will collect samples.

Samples will be collected by following the steps outlined below:

1. Place a laboratory provided sampling container directly into a stream of water downgradient and within close proximity to the potential non-visible pollutant discharge location;
2. Transfer the collected sample into the sample bottles (supplied by the lab for the appropriate parameters being monitored) filling the bottles completely (or as instructed by the laboratory);
3. The upgradient (uncontaminated) background samples will be collected first, prior to collecting the downgradient sample, in order to minimize cross-contamination; and
4. Sampling personnel will collect the water upgradient of where they are standing.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of powder-free nitrile gloves prior to the collection and handling of each sample at each location;
- Not contaminate the inside of the sample bottle by allowing it to come into contact with any material other than the water sample;
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection;
- Not leave the cooler lid open for an extended period of time once samples are placed inside;
- Not sample near a running vehicle where exhaust fumes may impact the sample;
- Not touch the exposed end of a sampling tube, if applicable;
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles;
- Not eat, smoke, or drink during sample collection nor sneeze or cough in the direction of an open sample bottle;

- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample;
- Decontaminate sampling equipment prior to sample collection using a tri-sodium phosphate (TSP) solution water wash and triple rinse with distilled or de-ionized water; and
- Dispose of decontamination water/soaps appropriately (i.e., do not discharge to the storm drain system or receiving water).

7.8.4 Sample Documentation

Sample documentation consists of appropriate information onto sample bottle identification labels, Chain-of-Custody forms, Sampling Activity Logs, and Inspection Checklists. It is important that waterproof labels, paper, and ink are used. These will be considered recordable documents. If an error is made on a document, the individual shall make corrections by lining through the error, initial and date, and entering the correct information. Copies of the Sampling Activity Log will be maintained in Appendix J.

Sampling and field analysis activity will be documented using the following forms:

- Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:
  - Project name
  - Project number
  - Unique sample identification number and location. (Example: EITP LUP-D1-110810 which would denote Project Name [EITP LUP], Sample Site [D1], Sample Date [mmddyy])
  - Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation (Example: EITP LUP-D1-110810-DUP1).
  - Collection date/time
  - Analysis constituent
- Sampling Activity Logs: A log of sampling events will identify:
  - Sampling date
  - Separate times for collected samples and QA/QC samples recorded to the nearest minute (am/pm)
  - Unique sample identification number and location
  - Analysis constituent
  - Names of sampling personnel
  - Weather conditions (including precipitation amount)
  - Field analysis results
  - Other pertinent data
- Chain-of-Custody (COC) forms: All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Proper transferring of responsibility must be recorded on the COC signature fields, the final signature will be of the receiving lab personnel. COC procedures will be strictly adhered to for QA/QC purposes.

- Storm Water Quality Construction Inspection Checklists: When applicable, the contractor's storm water inspector will document on the checklist that samples for non-visible pollutants were taken during a rain event.

7.8.5 Laboratory Analysis

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a Chain-of-Custody form provided by the analytical laboratory, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to the following California state-certified laboratory:

Laboratory Name:	Calscience Environmental Laboratories, Inc.
Address:	7440 Lincoln Way
	Garden Grove, CA
Telephone Number:	714-895-5494
Point of Contact:	

7.8.6 Sample Analysis

Samples will be analyzed for the applicable constituents using the analytical methods identified in Table 7-5 (Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants).

Laboratory Analysis: For samples that will be analyzed by a laboratory, sampling, preservation and analysis shall be performed by a state-certified laboratory in accordance with 40 CFR Part 136.

Field Analysis: For samples collected for field analysis, the collection, analysis, and equipment calibration will be in accordance with field instrument manufacturer's specifications. Table 7-4 lists the type of instruments used in the field for particular parameters.

Table 7-4
Field Analysis Instrumentation

Field Instrument	Constituent
pH Meter	pH
Turbidity Meter	Turbidity

- The instruments will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling event.
- Maintenance and calibration records will be maintained with the SWPPP.

Table 7-5
Sample Collection, Preservation and Analysis for Non-Visible Pollutants
EXAMPLE TABLE (call laboratory for specifications)

Parameter	Analytical Method	Minimum Sample Volume	Container	Preservation Method	Reporting Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3 x 40 mL	VOA-glass	Store at 4° C, HCl to pH<2	1 ug/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass-amber	Store at 4° C	10 ug/L	7 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-amber	Store at 4° C	0.1□ug/L	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-amber	Store at 4° C	Check Lab	7 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4° C	1 mg/L	48 hours
COD	EPA 410.4	1 x 250 mL	Glass-Amber	Store at 4° C, H2SO4 to pH<2	5 mg/L	28 days
DO	SM 4500-O G	1 x 250 mL	Glass-Amber	Store at 4° C	Check Lab	8 hours
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	unitless	Immediate
Alkalinity	SM 2320B	1 x 250 mL	Polypropylene	Store at 4° C	1 mg/L	14 days
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4° C, HNO3 to pH<2	0.1 mg/L	6 months
Metals (Chromium VI)	EPA 7199	1 x 500 mL	Polypropylene	Store at 4° C	01□ug/L	24 hours

- **Notes:**

°C	–	Degrees Celsius
BOD	–	Biological Oxygen Demand
COD	–	Chemical Oxygen Demand
DO	–	Dissolved Oxygen
EPA	–	Environmental Protection Agency
HCl	–	Hydrogen Chloride
H2SO4	–	Hydrogen Sulfide
HNO3	–	Nitric Acid
L	–	Liter
mg/L	–	Milligrams per Liter
ug/L	–	Micrograms per Liter
ml	–	Milliliter
PCB	–	Polychlorinated Biphenyl
SVOC	–	Semi-Volatile Organic Compound
SM	–	Standard Method
TPH	–	Total Petroleum Hydrocarbons
TRPH	–	Total Recoverable Petroleum Hydrocarbons
VOA	–	Volatile Organic Analysis
VOC	–	Volatile Organic Compound

7.9 Quality Assurance and Quality Control

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 5 percent or 1 duplicate per sampling event[1]. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicates will be collected where contamination is likely, not on the background sample. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

7.10 Retention of Records

All records, storm water monitoring information, lab data, and reports, including the Annual Report and supportive documentation, shall be retained for a period of at least three years. These records shall include:

A. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

B. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

C. The date and approximate time of analyses.

D. The individual(s) who performed the analyses.

E. A summary of all analytical results from the last three years, the method detection limits and reporting units, and the analytical techniques or methods used.

F. Rain gauge readings from site inspections.

G. Quality assurance/quality control records and results.

H. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records.

I. Visual observation and sample collection exception records.

J. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

[1] *Surface Water Ambient Monitoring Program (SWAMP) 2008 Quality Assurance Program Plan (QAPrP)*

APPENDIX A

CONSTRUCTION GENERAL PERMIT

ORDER NO. 2009-0009-DWQ AND AMENDMENT ORDER NO. 2010-0014-DWQ

The complete document can be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_complete.pdf

Will be placed in field SWPPP

APPENDIX B

SUBMITTED PERMIT REGISTRATION DOCUMENTS

1. Notice of Intent (NOI) – To be included in field SWPPP
2. LUP Type Flowchart
3. Site Maps and Vicinity Map
4. WDID Confirmation Letter – To be included in field SWPPP

SCE EITP – TELECOMMUNICATION CONSTRUCTION ACTIVITIES:

NOTICE OF INTENT

State Water Resources Control Board

NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY
(WQ ORDER No. 2009-0009-DWQ)

WDID: **Risk Level:**

Property Owner Information

Type: Special District

Name: Southern California Edison
Address: 8631 Rush Street
Address 2:
City/State/Zip: Rosemead CA 91770

Contact Name: John Slayton
Title:
Phone #: 310-990-1745
Email: john.slayton@sce.com

Contractor/Developer Information

Name: Southern California Edison
Address: 8631 Rush Street
Address 2:
City/State/Zip: Rosemead CA 91770

Contact Name: John Slayton
Title:
Phone #: 310-990-1745
Email: john.slayton@sce.com

Construction Site Information

Site Name: EITP Telecommunication Linear Construction Activites
Address: Interstate 15 and Nipton Road
City/State/Zip: Ivanpah CA 92364
County: San Bernardino
Latitude: 35.546946 Longitude: -115.470473

Contact Name: John Slayton
Title:
Site Phone #: 310-990-1745
Email: john.slayton@sce.com

Total Size of Construction Area: 40
Total Area to be Disturbed: 1

Construction Start: September 01, 2011
Complete Grading:
Final Stabilization: August 31, 2012

Type of Construction: *Above Ground*Below Ground*Communication Line*Electrical
Receiving Water: Ivanpah Lake
Qualified SWPPP Developer: Melanie Sotelo
Certification #:
RWQCB Jurisdiction: Region 6B - Victorville
Phone: 760-241-6583
Email: r6b_stormwater@waterboards.ca.gov

Certification

Name
Title:
Date:

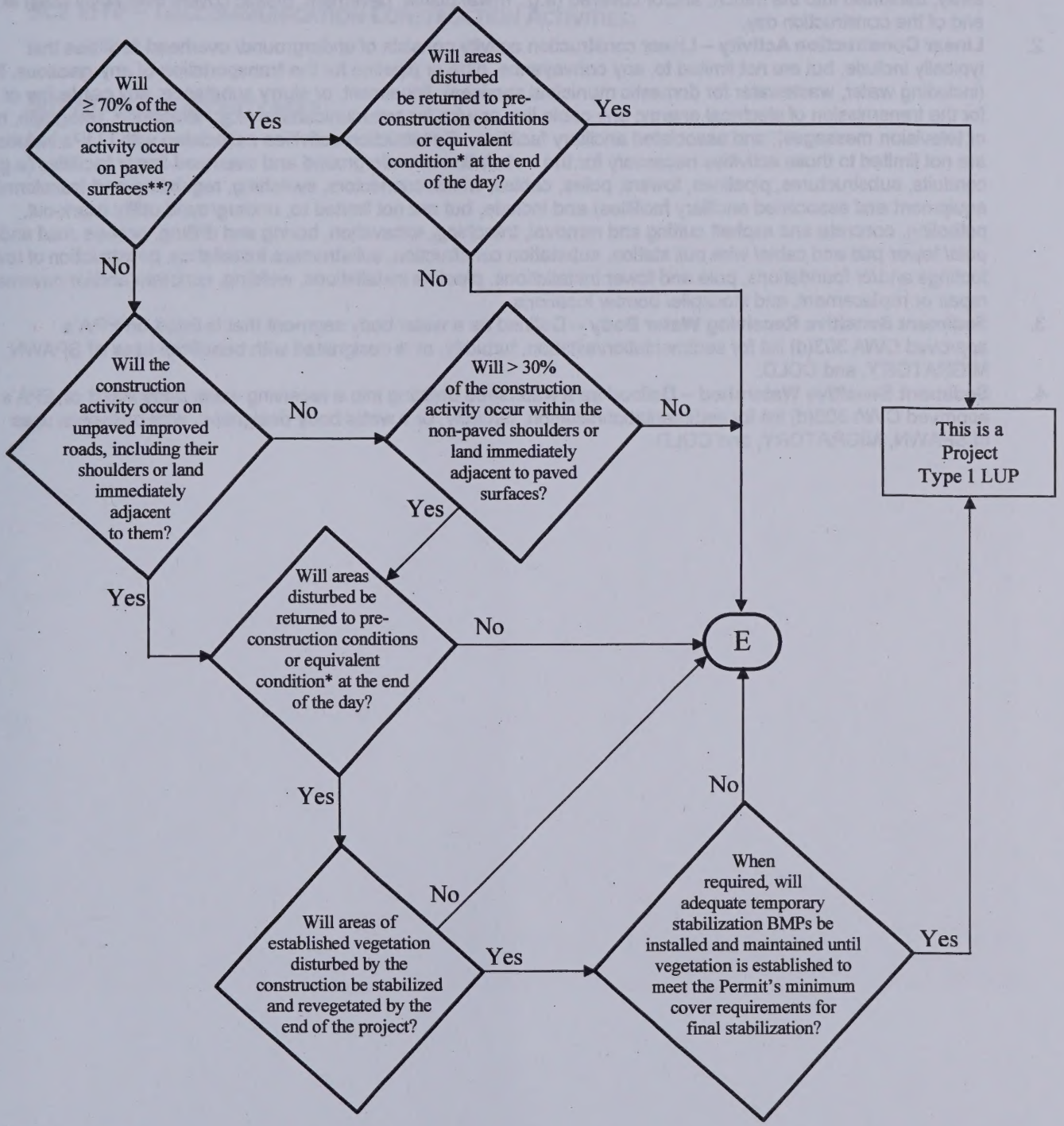
Segment Risk Information:

Segment Name	R Factor	K Factor	LS Factor	Beneficial Uses/303(d)	Risk Type
Nipton Road OPGW	10				Type1
Ivanpah Sub Tie-In	10			Yes	Type1
Nipton OPGW & Microwave Tower	10				Type1

SCE EITP – TELECOMMUNICATION CONSTRUCTION ACTIVITIES:

LUP TYPE FLOWCHART

ATTACHMENT A.1
LUP Project Area or Project Section Area Type Determination


Will ≥ 70% of the construction activity occur on paved surfaces**?
Yes
Will areas disturbed be returned to pre-construction conditions or equivalent condition* at the end of the day?
Yes
No
No
Will the construction activity occur on unpaved improved roads, including their shoulders or land immediately adjacent to them?
No
Will > 30% of the construction activity occur within the non-paved shoulders or land immediately adjacent to paved surfaces?
No
This is a Project Type 1 LUP
Yes
Yes
Will areas disturbed be returned to pre-construction conditions or equivalent condition* at the end of the day?
No
E
Yes
No
Will areas of established vegetation disturbed by the construction be stabilized and revegetated by the end of the project?
No
Yes
When required, will adequate temporary stabilization BMPs be installed and maintained until vegetation is established to meet the Permit's minimum cover requirements for final stabilization?
Yes

*See Definition of Terms
** Or: "Will < 30% of the soil disturbance occur on unpaved surfaces?

ATTACHMENT A.1
Definition of Terms

1. **Equivalent Condition** – Means disturbed soils such as those from trench excavation are required to be hauled away, backfilled into the trench, and/or covered (e.g., metal plates, pavement, plastic covers over spoil piles) at the end of the construction day.
2. **Linear Construction Activity** – Linear construction activity consists of underground/ overhead facilities that typically include, but are not limited to, any conveyance, pipe or pipeline for the transportation of any gaseous, liquid (including water, wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/ tower pad and cable/ wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/ borrow locations.
3. **Sediment Sensitive Receiving Water Body** – Defined as a water body segment that is listed on EPA's approved CWA 303(d) list for sedimentation/siltation, turbidity, or is designated with beneficial uses of SPAWN, MIGRATORY, and COLD.
4. **Sediment Sensitive Watershed** – Defined as a watershed draining into a receiving water body listed on EPA's approved CWA 303(d) list for sedimentation/siltation, turbidity, or a water body designated with beneficial uses of SPAWN, MIGRATORY, and COLD.

SCE EITP – TELECOMMUNICATION CONSTRUCTION ACTIVITIES:

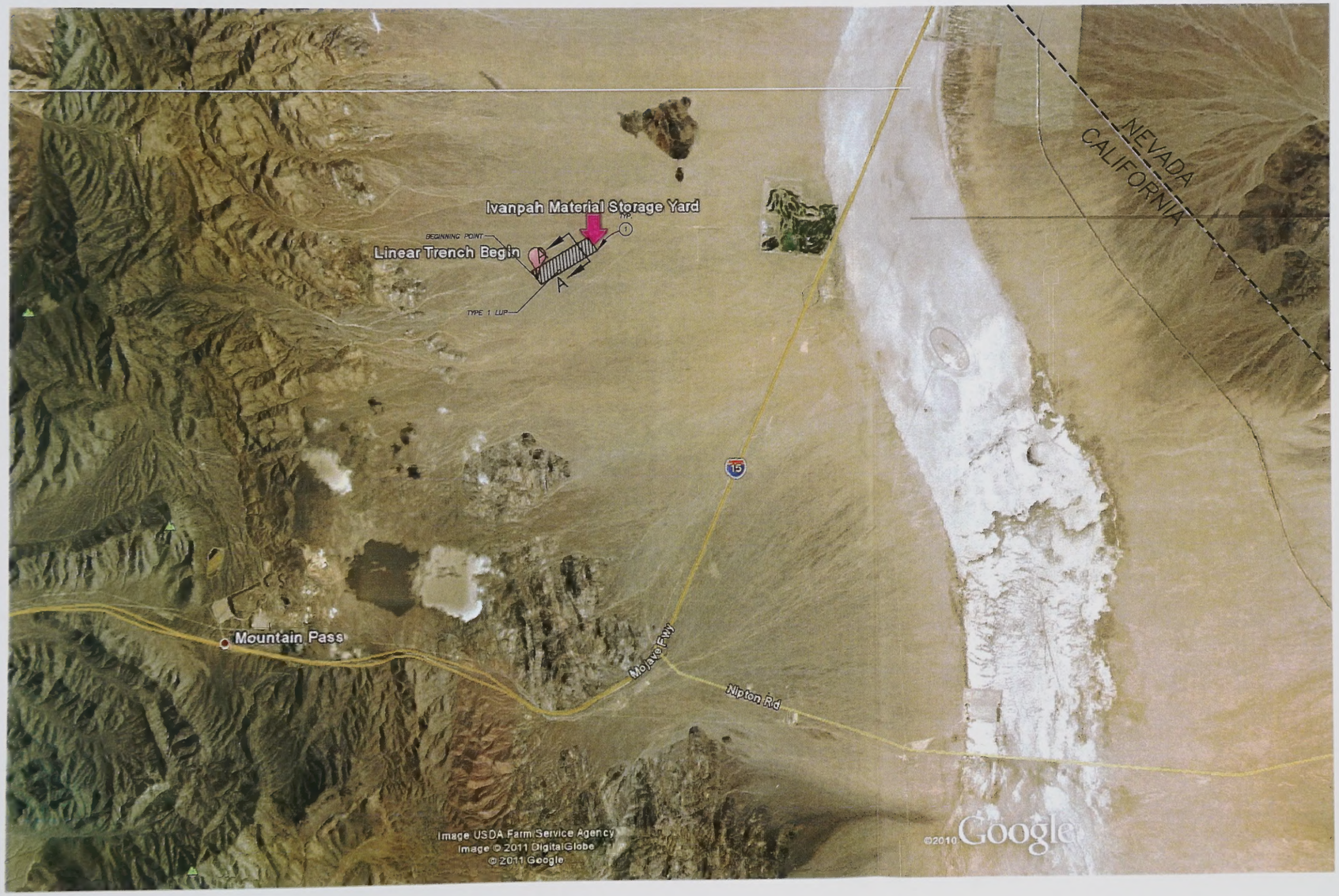
SITE MAPS AND VICINITY MAP

VICINITY MAP
FOR
EITP – TELECOMMUNICATION LINEAR CONSTRUCTION ACTIVITIES
NIPTON AND IVANPAH
SAN BERNARDINO COUNTY

N

N.T.S.

SITE MAP
FOR
ELDORADO-IVANPAH TRANSMISSION PROJECT
TELECOMMUNICATION LINEAR CONSTRUCTION ACTIVITIES
IVANPAH
SAN BERNARDINO COUNTY, CALIFORNIA



WATER POLLUTION CONTROL NOTES

1. INSTALL FIBER ROLL OR GRAVEL BAG LINEAR BARRIER PER CASQA BMP SE-5 OR SE-8, RESPECTIVELY.

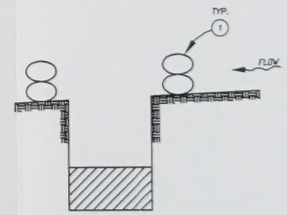
LEGEND

- LWM — LIQUID WASTE MANAGEMENT
- CW — CONCRETE WASHOUT
- SWM — SANITARY WASTE MANAGEMENT
- SP — STOCKPILE MANAGEMENT
- STATELINE
- TRENCHING ACTIVITIES

NOTE: THIS PROJECT WILL UTILIZE DESIGNATED MATERIAL STORAGE YARDS. ANY NECESSARY ADDITIONAL AREAS/ACTIVITIES WILL BE FIELD LOCATED BY SCE AS CONSTRUCTION PROGRESSES.

GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE CONTRACTOR AND SUBCONTRACTORS TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.
3. SECTION 3 OF THE SWPPP DESCRIBES THE BEST MANAGEMENT PRACTICES TO BE USED ON THIS SITE.
4. IMPLEMENTATION OF THE VARIOUS WATER POLLUTION CONTROL MEASURES WILL CONFORM TO THE REQUIRED CONSTRUCTION STAGING REQUIREMENTS.



SECTION A-A
TYPICAL TRENCH DETAIL
NOT TO SCALE

N.T.S.

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: ELDORADO-IVANPAH TRANSMISSION PROJECT TELECOMMUNICATION CONSTRUCTION ACTIVITIES

STORM WATER POLLUTION PREVENTION PLAN
SITE MAP

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO.
SITE MAP-02

SCALE: N.T.S.

2 OF 3 SHTS.

OVERALL SITE MAP
FOR
ELDORADO-IVANPAH TRANSMISSION PROJECT
TELECOMMUNICATION LINEAR CONSTRUCTION ACTIVITIES
CALIFORNIA SIDE
SAN BERNARDINO COUNTY, CALIFORNIA

WATER POLLUTION CONTROL NOTES

(1) INSTALL FIBER ROLL OR GRAVEL BAG LINEAR BARRIER PER CASQA BMP SE-5 OR SE-6, RESPECTIVELY.

LEGEND

- LWM — LIQUID WASTE MANAGEMENT
- CW — CONCRETE WASHOUT
- SWM — SANITARY WASTE MANAGEMENT
- SP — STOCKPILE MANAGEMENT

NOTE: MATERIAL STORAGE YARDS. ANY NECESSARY ADDITIONAL AREAS/ACTIVITIES WILL BE FIELD LOCATED BY SCE AS CONSTRUCTION PROGRESSES.

- STATELINE
- TRENCHING ACTIVITIES
- PROPOSED MICROWAVE TOWER LOCATION

GENERAL NOTES

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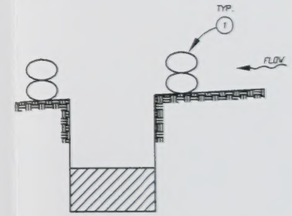
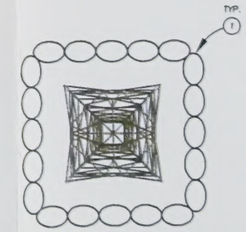


SECTION A-A
TYPICAL TRENCH DETAIL
NOT TO SCALE



MICROWAVE TOWER PROTECTION DETAIL
NOT TO SCALE

N.T.S.

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: ELDORADO-IVANPAH TRANSMISSION PROJECT TELECOMMUNICATION CONSTRUCTION ACTIVITIES

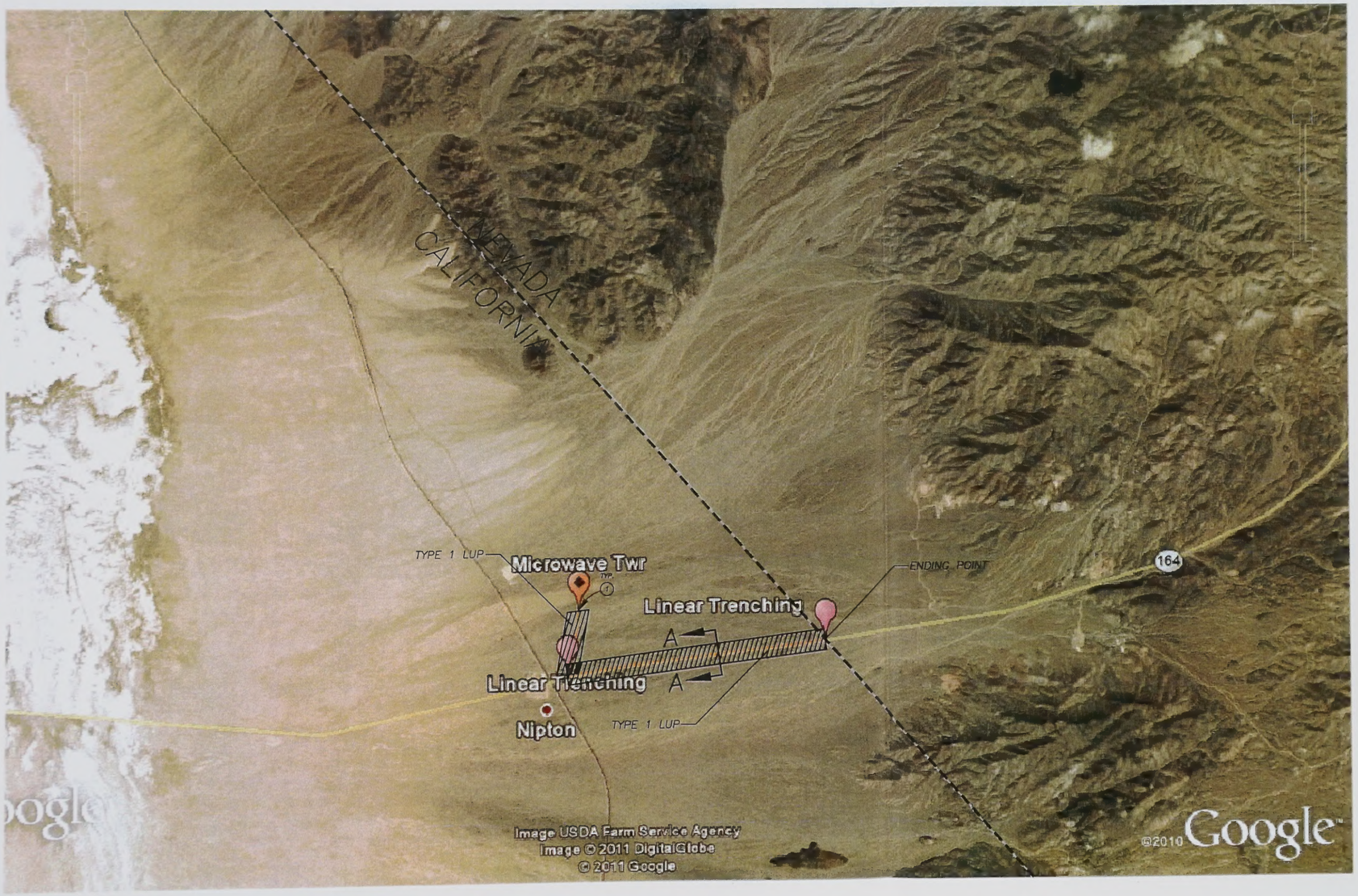
STORM WATER POLLUTION PREVENTION PLAN
SITE MAP

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO.
SITE MAP-01

SCALE: N.T.S.
1 OF 3 SHTS.

SITE MAP
FOR
ELDORADO-IVANPAH TRANSMISSION PROJECT
TELECOMMUNICATION LINEAR CONSTRUCTION ACTIVITIES
NORTHEAST OF NIPTON TO STATE LINE
SAN BERNARDINO COUNTY, CALIFORNIA



WATER POLLUTION CONTROL NOTES

(1) INSTALL FIBER ROLL OR GRAVEL BAG LINEAR BARRIER PER CASQA BMP SE-5 OR SE-6, RESPECTIVELY.

LEGEND

- LWM — LIQUID WASTE MANAGEMENT
- CW — CONCRETE WASHOUT
- SWM — SANITARY WASTE MANAGEMENT
- SP — STOCKPILE MANAGEMENT

NOTE: THIS PROJECT WILL UTILIZE DESIGNATED MATERIAL STORAGE YARDS. ANY NECESSARY ADDITIONAL AREAS/ACTIVITIES WILL BE FIELD LOCATED BY SCE AS CONSTRUCTION PROGRESSES.

- STATELINE
- TRENCHING ACTIVITIES
- PROPOSED MICROWAVE TOWER LOCATION

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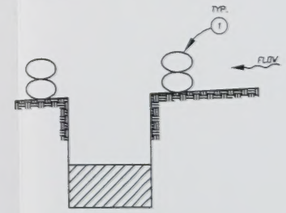
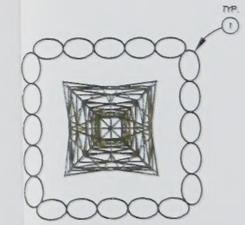


SECTION A-A
TYPICAL TRENCH DETAIL
NOT TO SCALE



MICROWAVE TOWER PROTECTION DETAIL
NOT TO SCALE

N.T.S.

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: ELDORADO-IVANPAH TRANSMISSION PROJECT TELECOMMUNICATION CONSTRUCTION ACTIVITIES

STORM WATER POLLUTION PREVENTION PLAN
SITE MAP

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO.
SITE MAP-03

SCALE: N.T.S.

3 OF 3 SHTS.

SCE EITP – TELECOMMUNICATION CONSTRUCTION ACTIVITIES:

WDID CONFIRMATION LETTER

APPENDIX C

AMENDMENT LOG AND CHANGES TO PRDS (DUE TO CHANGE OF: OWNERSHIP OR ACREAGE)

SWPPP AMENDMENT LOG

Project Name: SCE EITP – Telecommunication Linear Construction Activities

Amendment No.	Prepared by QSD	Brief Description of Amendment	Date

APPENDIX D

CONSTRUCTION SCHEDULE

Construction Schedule (see SWPPP Section 2.4 – or replace with contractor provided schedule)

Estimated Dates	Event or Construction Phase
09/01/11	Estimated Project Construction Start Date
08/31/12	Estimated Project Construction Completion Date

APPENDIX E

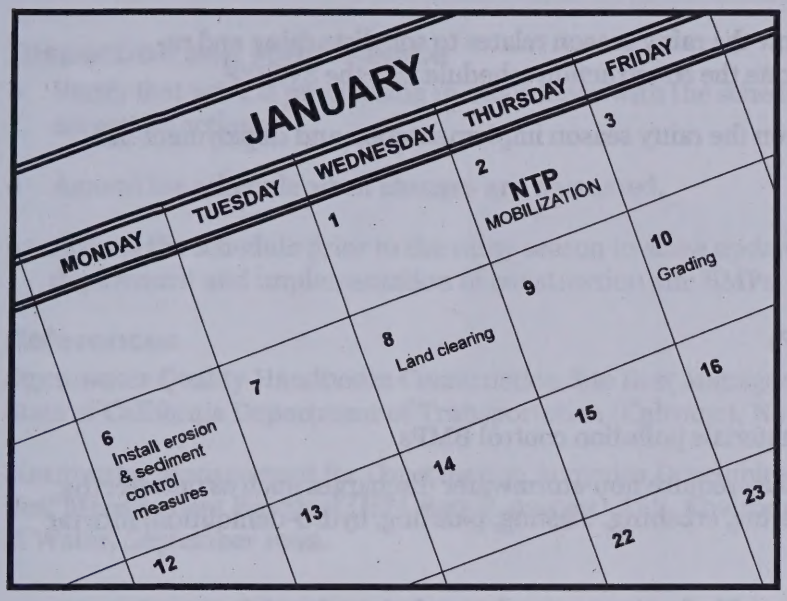
CONSTRUCTION ACTIVITIES, MATERIALS USED AND ASSOCIATED POLLUTANTS

(Included in Section 2.5 of the text)

APPENDIX F

CASQA 2009 CONSTRUCTION BMP HANDBOOK FACT SHEETS

Scheduling EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

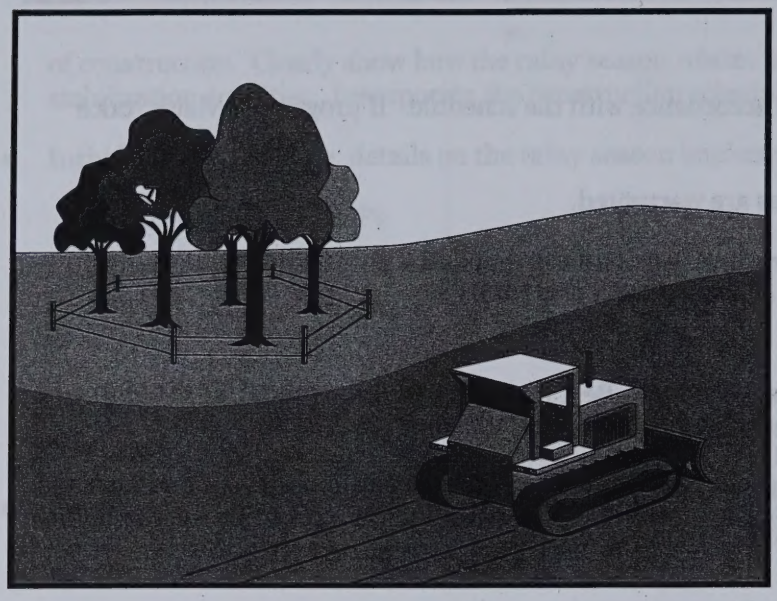
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Limitations

- Requires forward planning by the owner/developer,

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contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

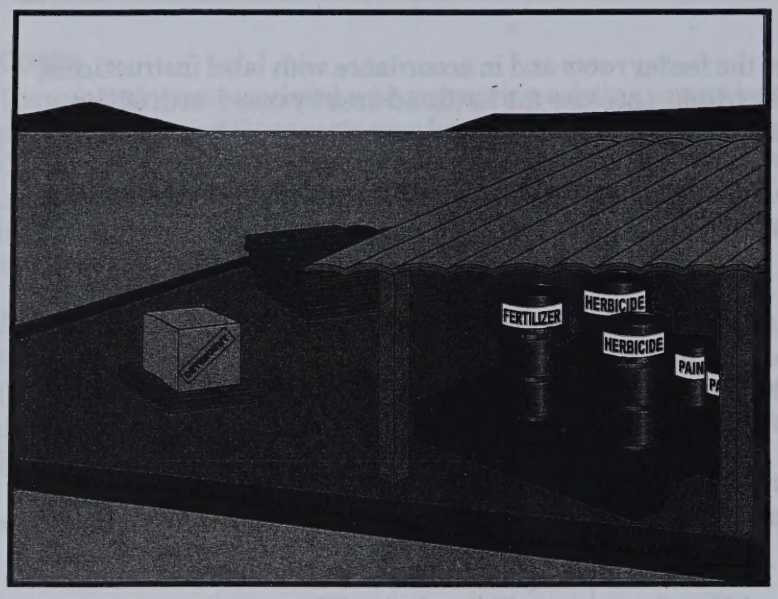
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

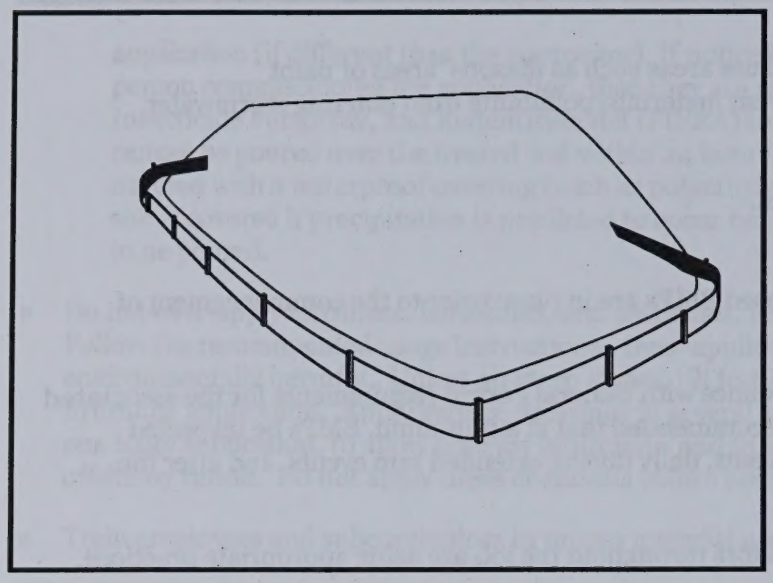
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Cover and project soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

Stockpiles of fly ash, stucco, hydrated lime

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

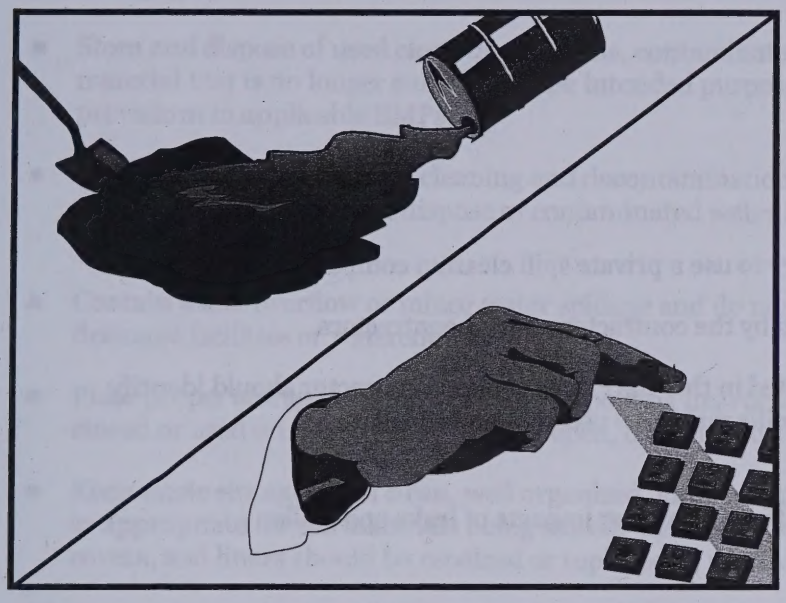
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

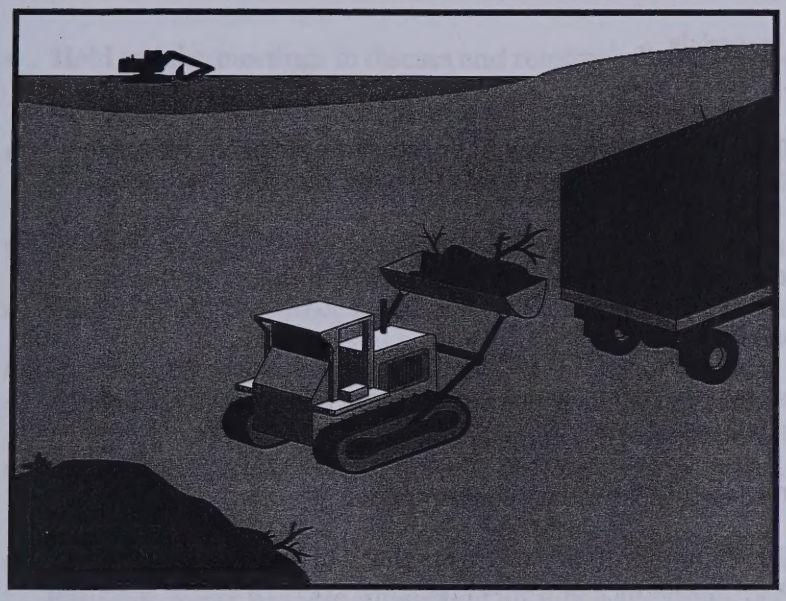
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

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plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

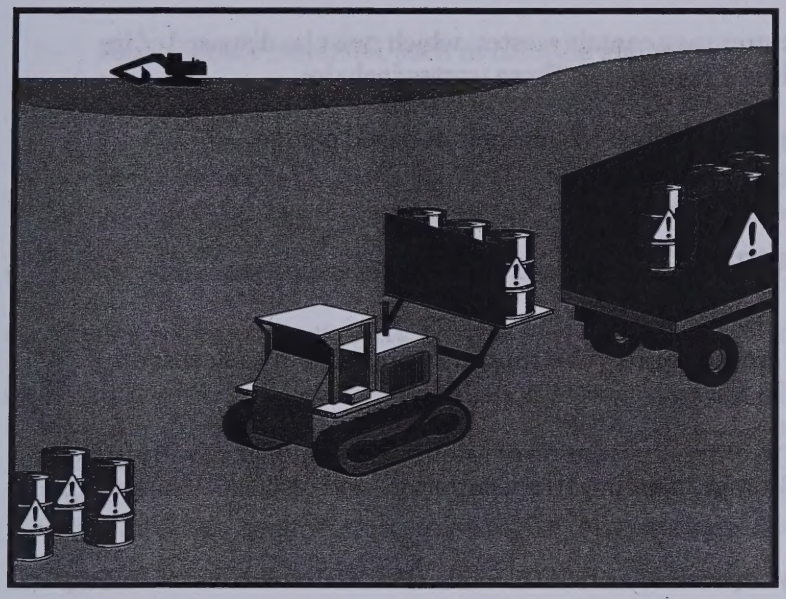
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Hazardous Waste Management WM-6



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

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In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
  - Ensure that adequate hazardous waste storage volume is available.
  - Ensure that hazardous waste collection containers are conveniently located.
  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
  - Minimize production or generation of hazardous materials and hazardous waste on the job site.
  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
  - Segregate potentially hazardous waste from non-hazardous construction site debris.
  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

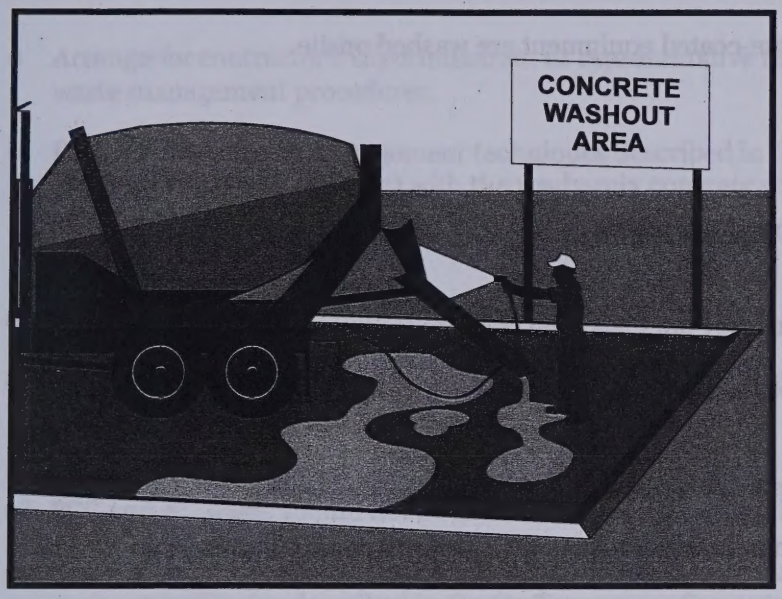
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

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- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washout should be lined so there is no discharge into the underlying soil.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a "roll-off"; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

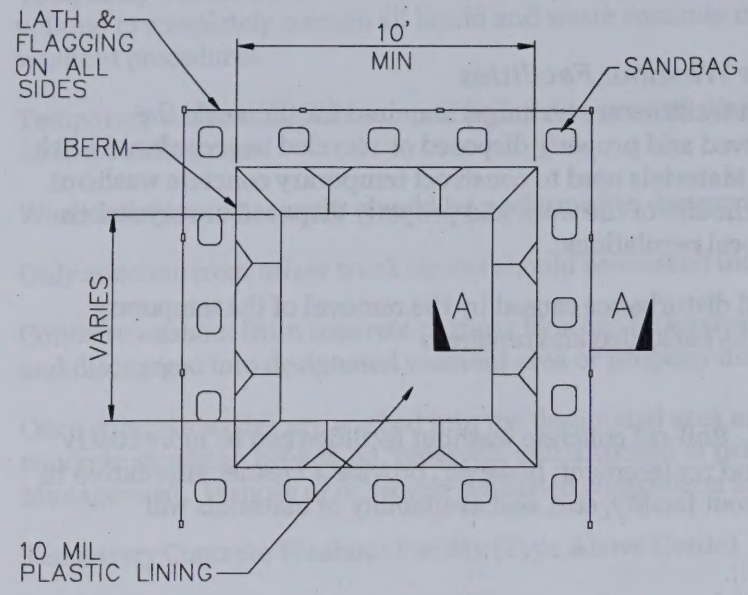
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

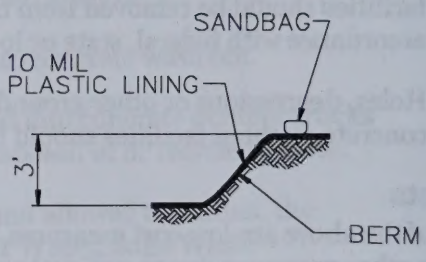
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

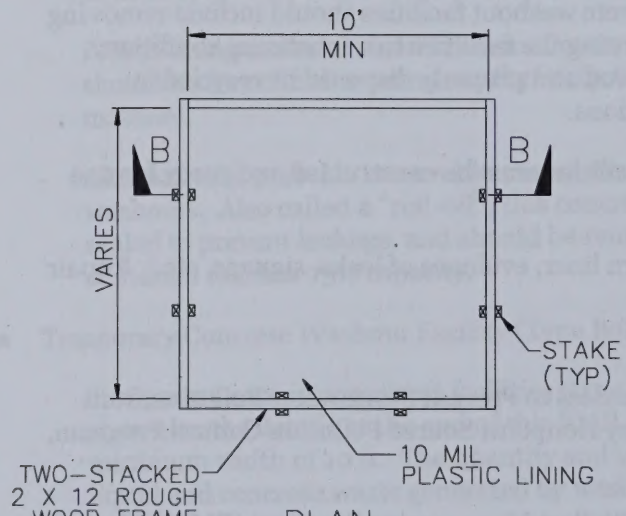
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



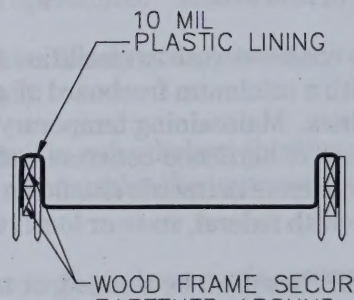
PLAN
NOT TO SCALE
TYPE "BELOW GRADE"



SECTION A–A
NOT TO SCALE



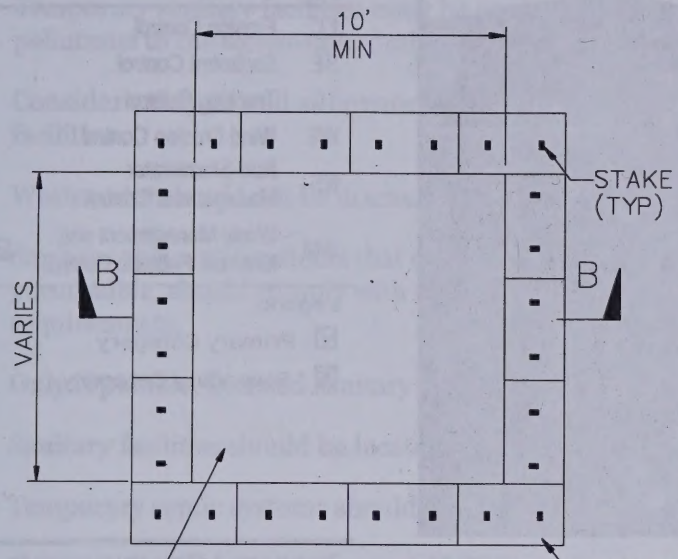
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



SECTION B–B
NOT TO SCALE

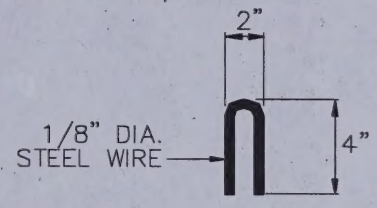
NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

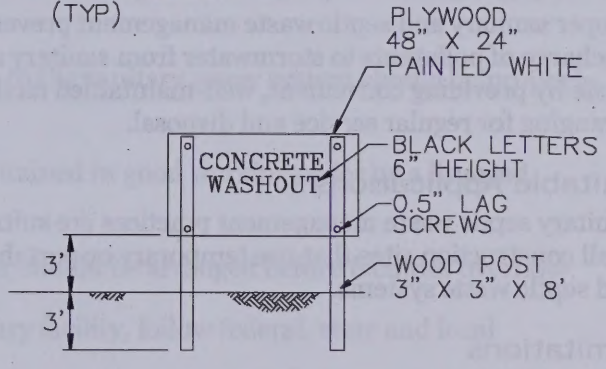


PLAN
NOT TO SCALE

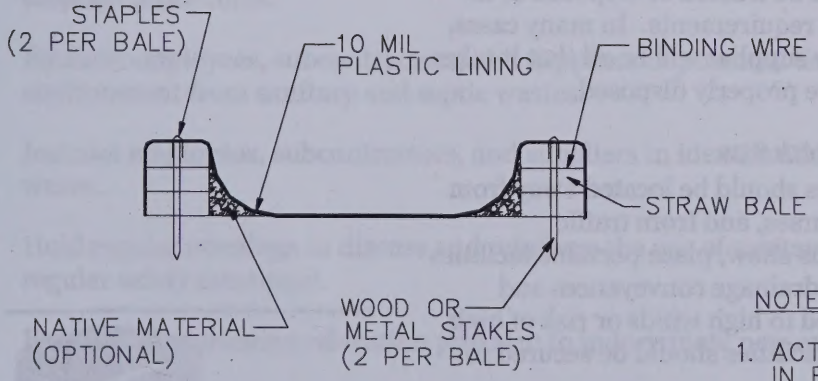
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

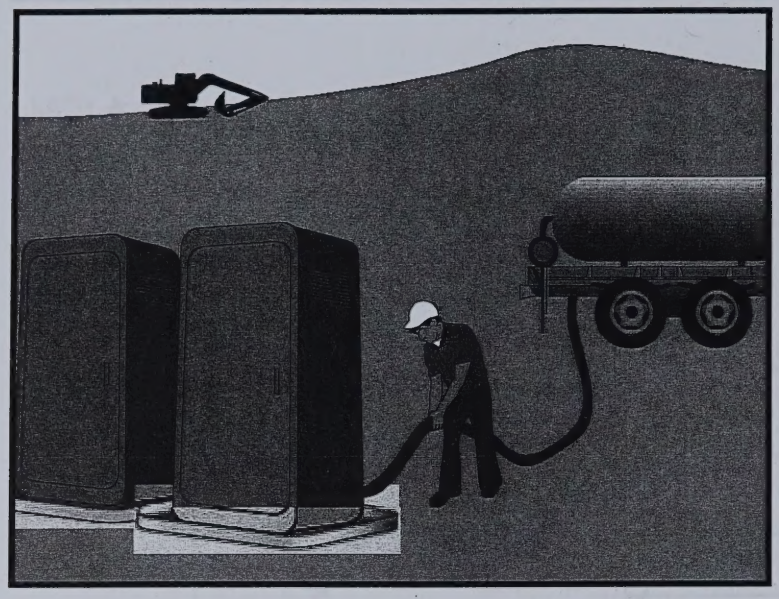


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

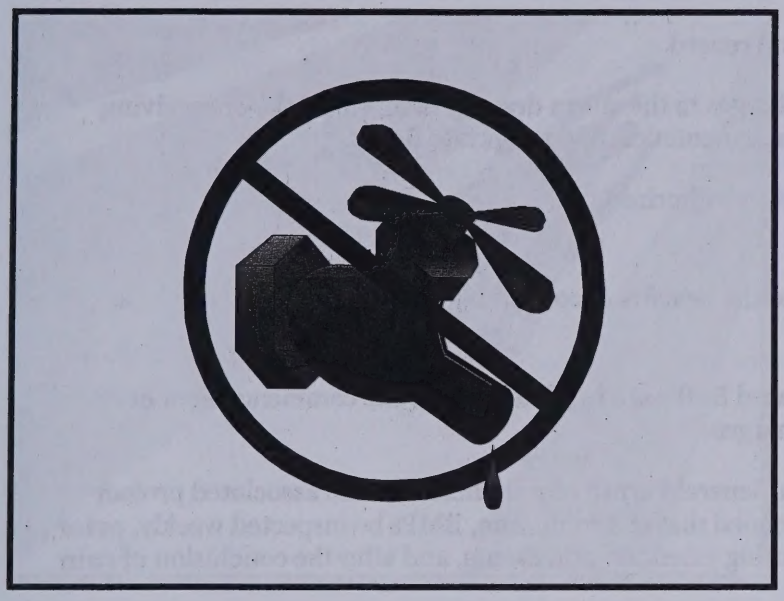
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

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into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

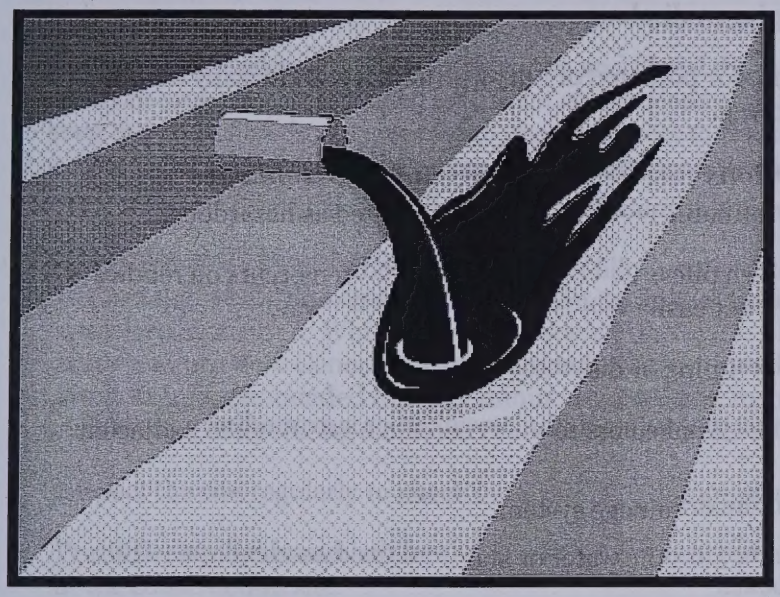
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Illicit Connection/Discharge NS-6



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

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of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General** – unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

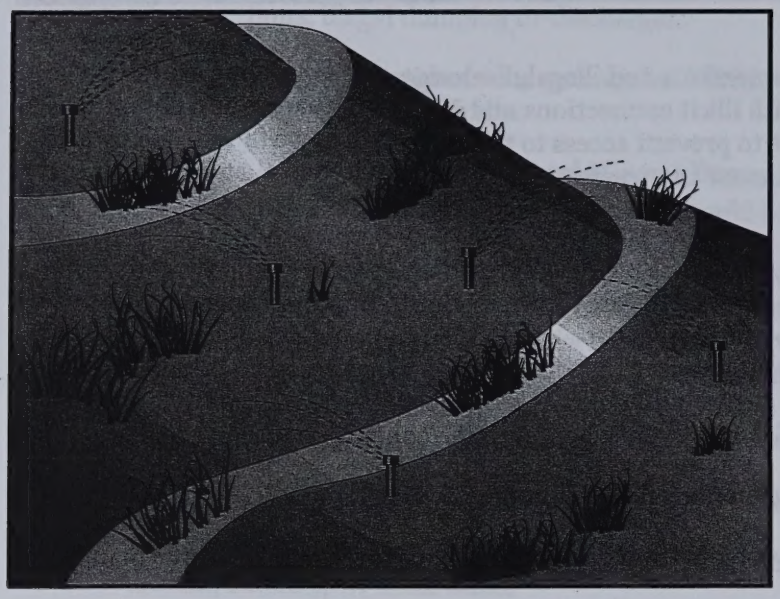
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water/Irrigation NS-7



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for

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excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

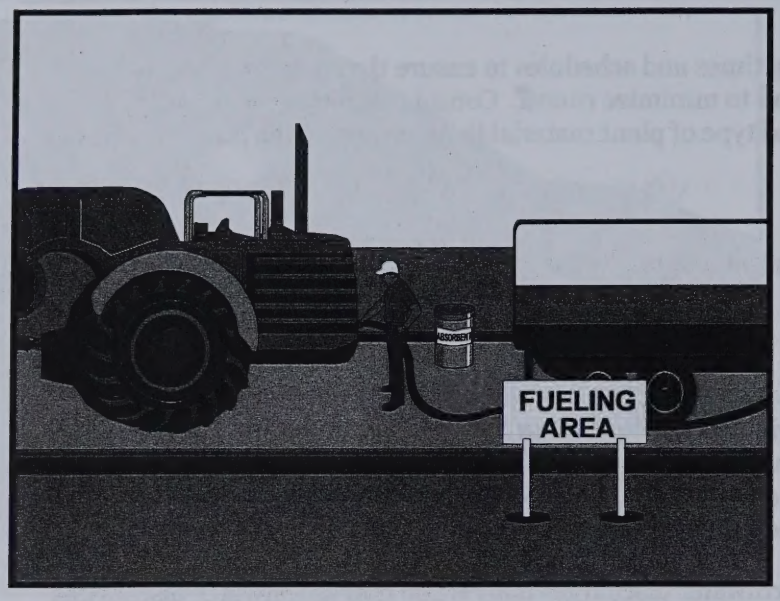
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Fueling NS-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

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be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and

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Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

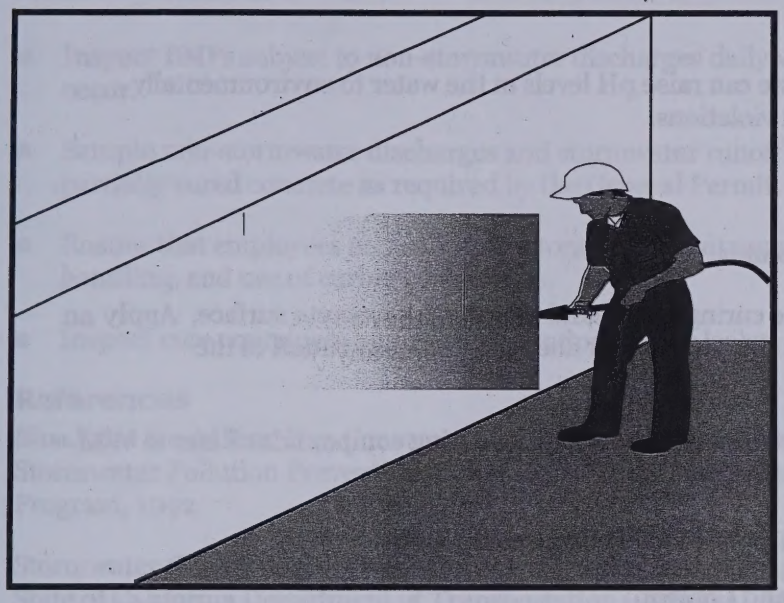
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Concrete Curing NS-12



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

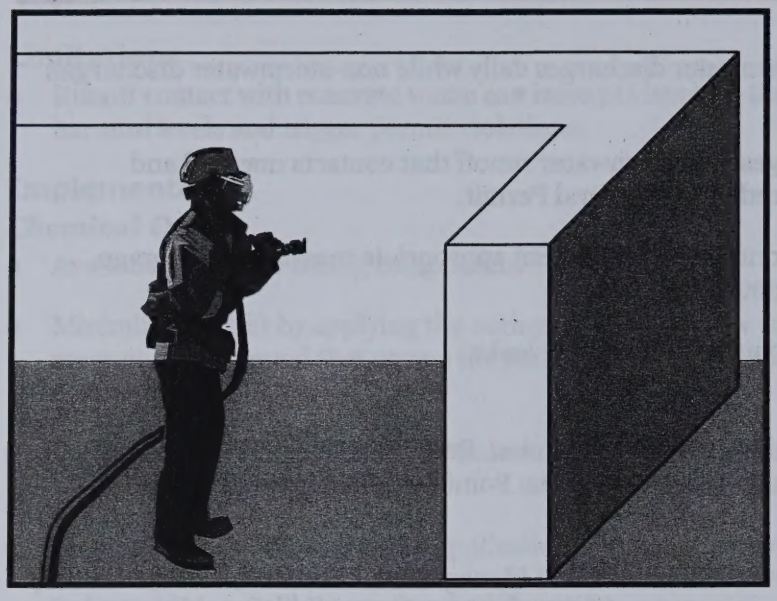
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

EC	Erosion Control	
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Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

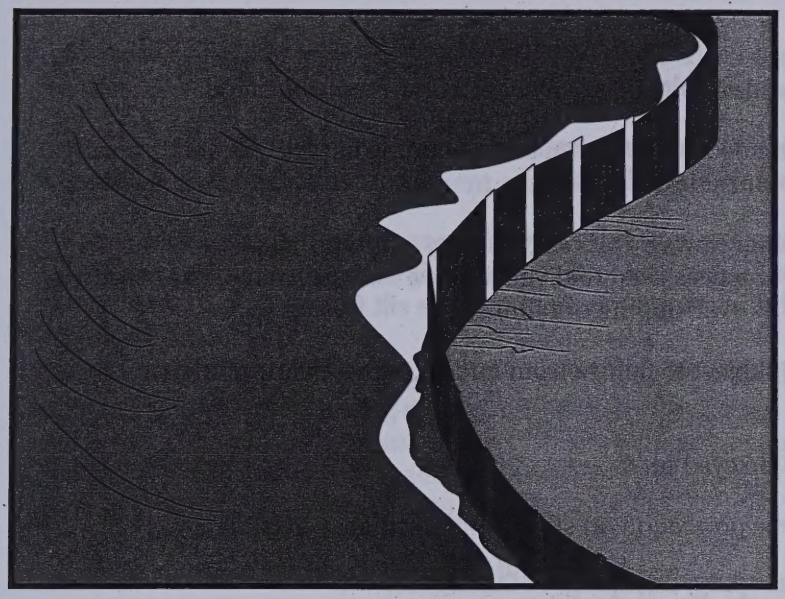
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Silt Fence SE-1



Categories

EC	Erosion Control	
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TC	Tracking Control	
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Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
SE-8 Sandbag Barrier
SE-10 Storm Drain Inlet Protection
SE-14 Biofilter Bags

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The

reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec^{-1} and 0.15 sec^{-1} in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).
- Bottom of the silt fence should be keyed-in a minimum of 12 in.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.
- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.
- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.
- The trench should be backfilled with native material and compacted.
- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the

toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of $^1/_3$ and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the gerotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
    - Minimal soil disturbance.
    - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
    - Uniform installation.
    - Less susceptible to undercutting/undermining.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Silt Fence

SE-1

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

SECTION A–A

DETAIL A

JOINING SECTION DETAIL (TOP VIEW)

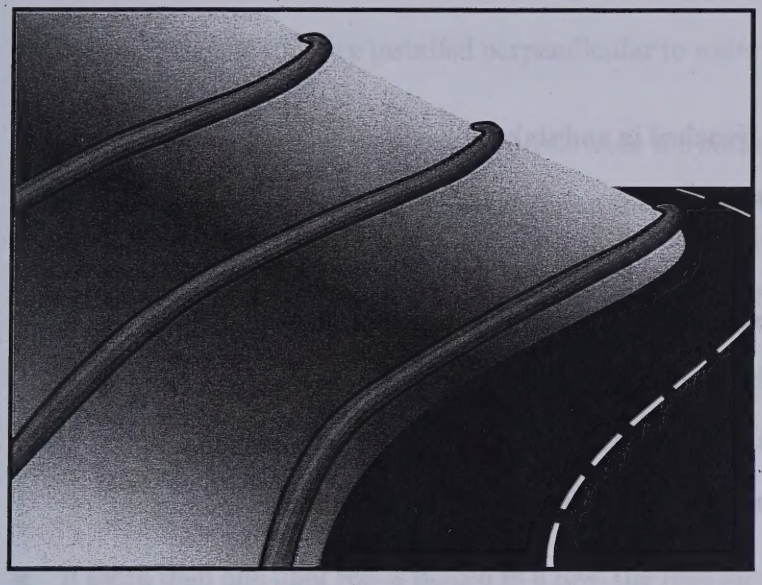
END STAKE DETAIL (TOP VIEW)

END DETAIL

STAPLE DETAIL
(SEE NOTE 9)

OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

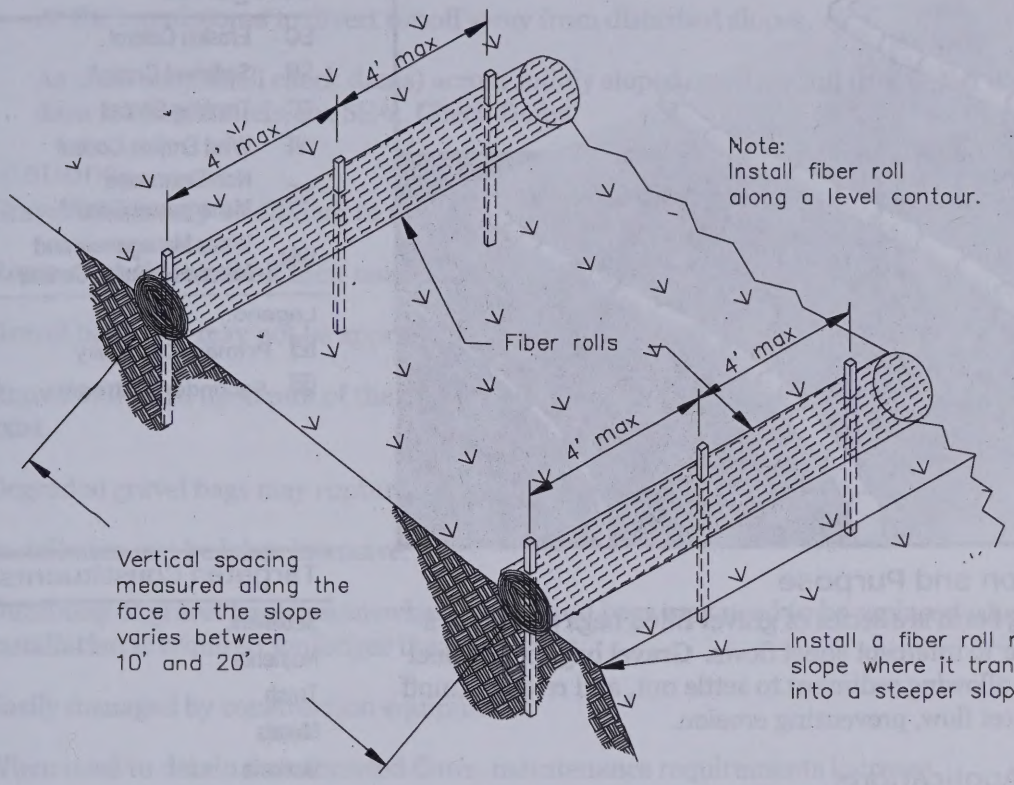
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

References

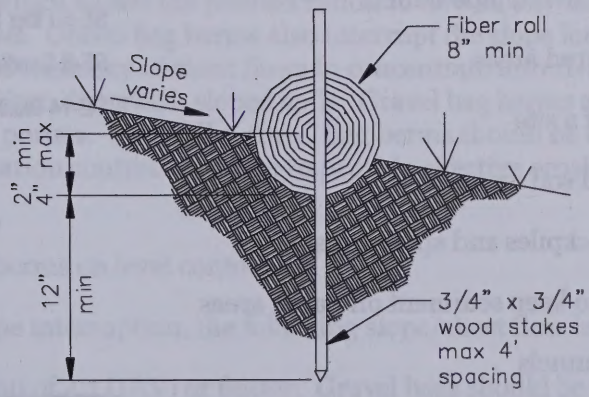
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION

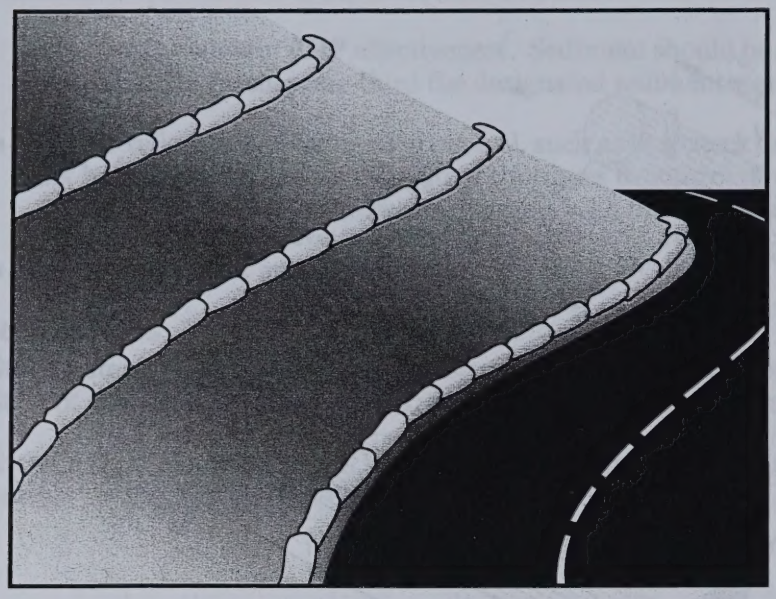
N.T.S.



ENTRENCHMENT DETAIL

N.T.S.

Gravel Bag Berm SE-6



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Roll
SE-8 Sandbag Barrier
SE-14 Biofilter Bags

Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- *Bag Material:* Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- *Bag Size:* Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.
- *Fill Material:* Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual; Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7

Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

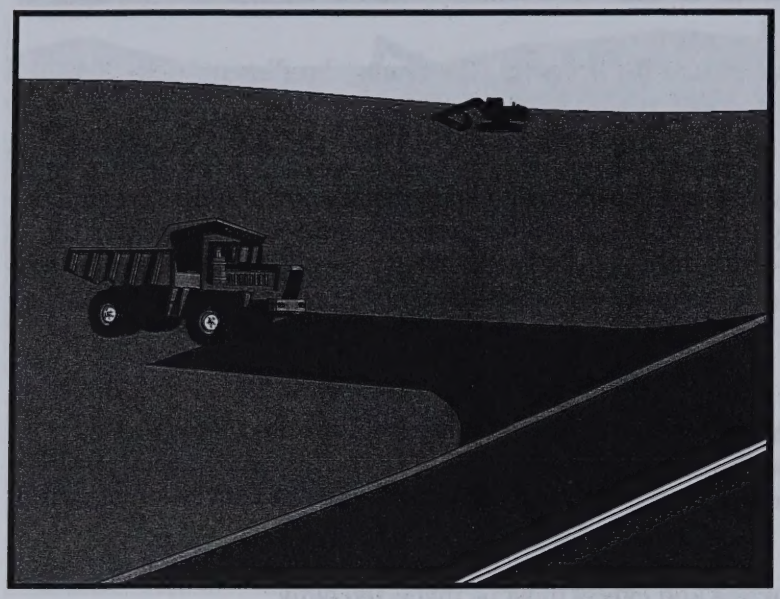
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Stabilized Construction Entrance/Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

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Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

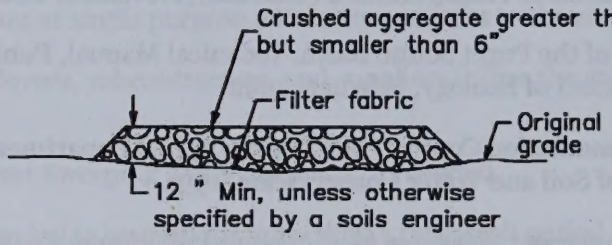
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

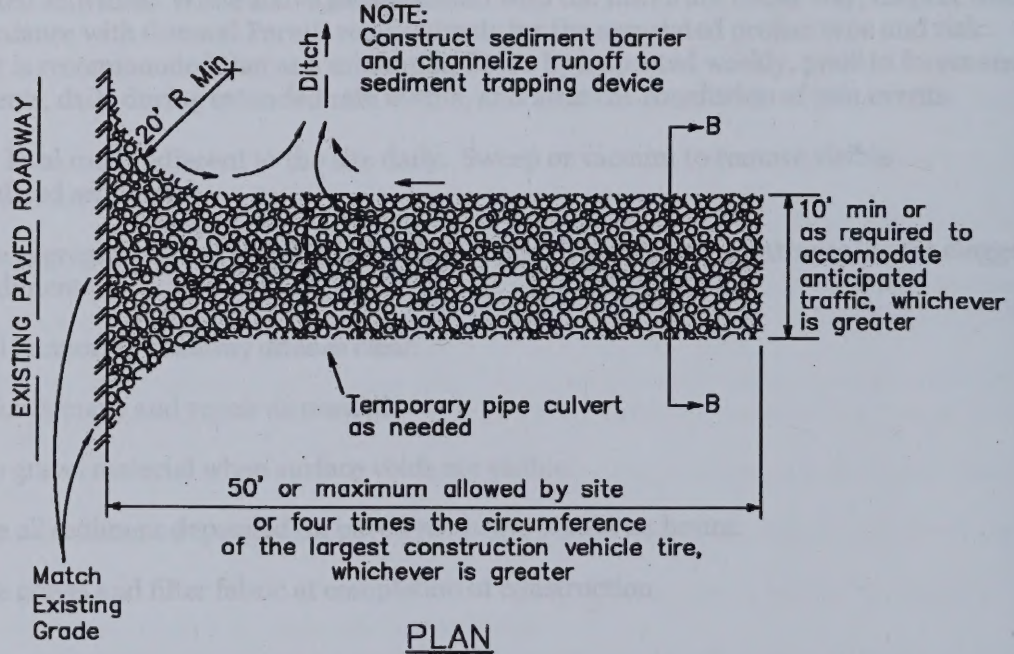
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance/Exit TC-1

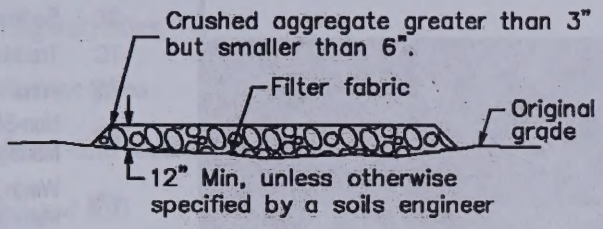

Crushed aggregate greater than 3" but smaller than 6"
Filter fabric
Original grade
12 " Min, unless otherwise specified by a soils engineer

SECTION B–B
NTS

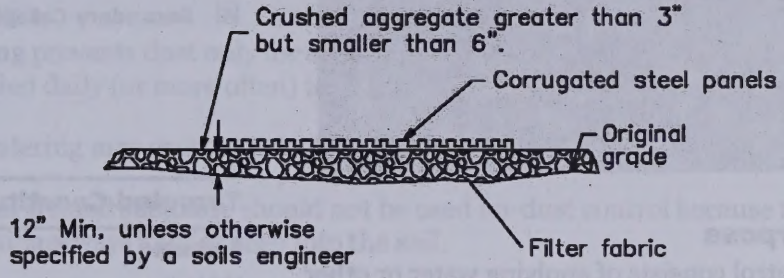

NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Ditch
20' R Min
EXISTING PAVED ROADWAY
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater
Temporary pipe culvert as needed
50' or maximum allowed by site
or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade

PLAN
NTS

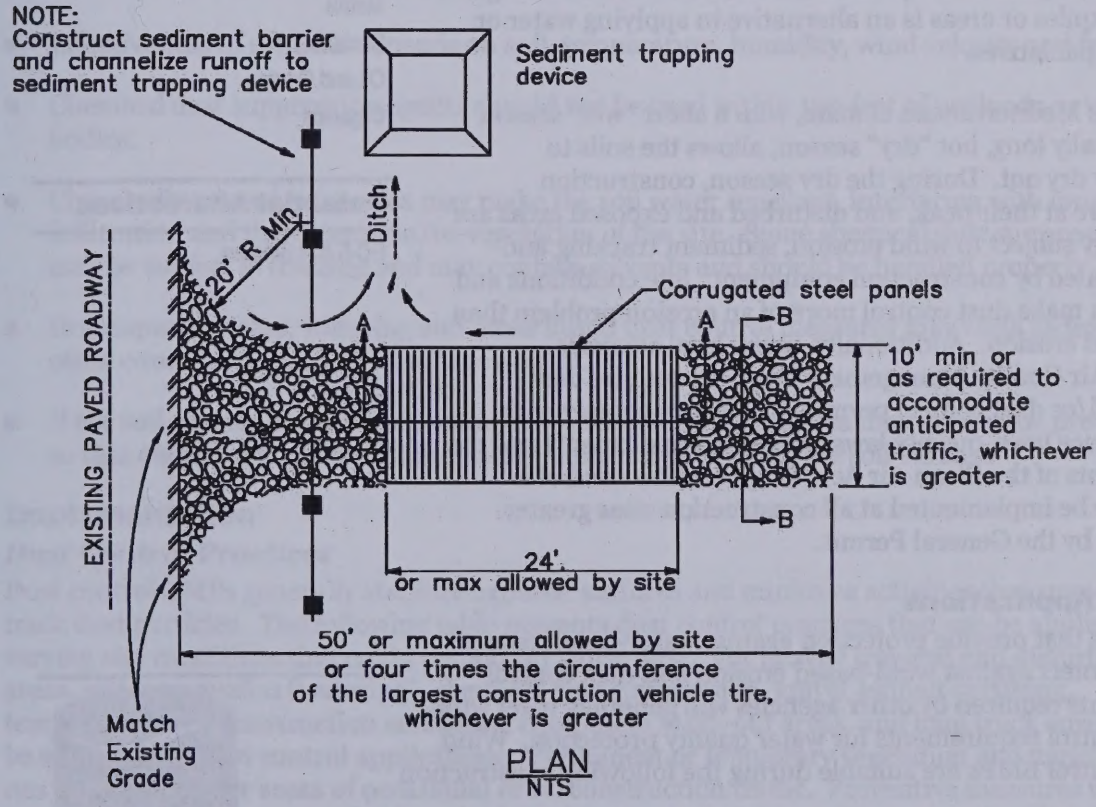
Stabilized Construction Entrance/Exit TC-1


Crushed aggregate greater than 3" but smaller than 6".
Filter fabric
Original grade
12" Min, unless otherwise specified by a soils engineer

SECTION B–B
NTS

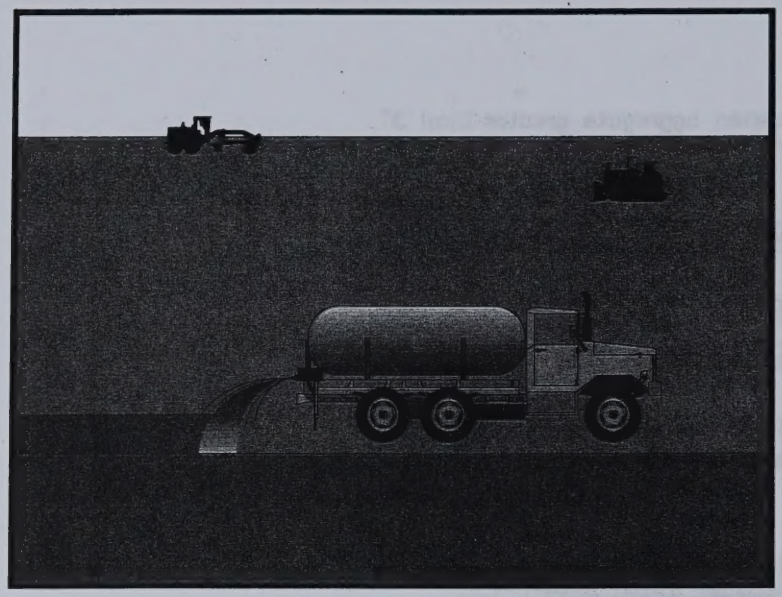

Crushed aggregate greater than 3" but smaller than 6".
Corrugated steel panels
Original grade
12" Min, unless otherwise specified by a soils engineer
Filter fabric

SECTION A–A
NOT TO SCALE


NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Sediment trapping device
Ditch
20' R Min
EXISTING PAVED ROADWAY
Corrugated steel panels
A
A
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater.
24', or max allowed by site
50' or maximum allowed by site
or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade

PLAN
NTS

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppressants	Gravel or Asphalt	Temporary Gravel Construction Entrance/Exit/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Unpaved Construction Roads	x	x	x	x	x			x
Unpaved Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Cleaning/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

APPENDIX G

RESPONSIBLE PARTIES

(Also see Section 6)

Responsible Parties

Title and Contact Information	Area of Responsibility
Legally Responsible Person: Entity Name: Southern California Edison Contact Person: TBD Address: 14005 South Benson Avenue City, State, Zip: Chino, CA 91710 Telephone Number: Fax: Email:	Property Owner and Permittee under the General Permit
Authorized Signatory for the LRP: Contact Person: TBD Address: 14005 South Benson Avenue City, State, Zip: Chino, CA 91710 Telephone Number: Fax: Email:	Authorized to sign (and certify) on behalf of the LRP: the Notice of Intent, Notice of Termination, Changes to the Permit Registration Documents, SWPPP Certification, Annual Reports, Non-Compliance reports, and any other information requested by the RWQCB, SWRCB, or EPA under the General Permit.
Qualified SWPPP Developer: Company Name: AEI-CASC Consulting QSD Name: Melanie Sotelo, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (909) 783-0101, ext 1600 Fax: (909) 783-0108 Email: msotelo@aei-casc.com	Draft the SWPPP and any SWPPP amendments and certify compliance of the SWPPP with the General Permit.
Additional Qualified SWPPP Developer: Company Name: AEI-CASC Consulting QSD Name: Alan Batdorf, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (949) 453-1783 Cell: (949) 648-6695 Fax: (949) 453-1860 Email: abatdorf@aei-casc.com	Draft any SWPPP amendments and certify compliance of the SWPPP with the General Permit.

Title and Contact Information	Area of Responsibility
Qualified SWPPP Practitioner: Company Name: Southern California Edison QSP Name: John Slayton, CPESC Address: 14005 South Benson Avenue City, State, Zip: Chino, CA, 91710 Telephone Number (including emergency contact number[s]): (310) 990-1745 Fax: Email: john.slayton@sce.com	Implement the SWPPP on a daily basis at the Project, oversee the training of contractors and other personnel undertaking SWPPP-related duties, monitor and direct contractors with SWPPP responsibilities (including those installing or maintaining BMPs), oversee the inspection and monitoring programs, perform inspections or delegate others to do so (see other delegated inspectors below), prepare reports required by the SWPPP for review and certification by the LRP's representative.
SWPPP Inspector: Company Name: AEI-CASC Consulting QSP Name: Matt Renaud, CPESC Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (818) 263-3566 Fax: (949) 453-1860 Email: mrenaud@aei-casc.com	Conduct inspections under the supervision of the QSP.
Additional SWPPP Inspector: Company Name: AEI-CASC Consulting QSP Name: Michael O'Hearn, CESSWI Address: 18 Technology Drive, Suite 135 City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (714) 497-7276 Fax: (949) 453-1860 Email: mohearn@aei-casc.com	Conduct inspections under the supervision of the QSP.
Contractor/Subcontractor Company Name: QSD Name: Address: City, State, Zip: Telephone Number (including emergency contact number[s]): Fax: Email:	Install, maintain, and replace erosion and sediment controls.

APPENDIX H

CONTRACTORS AND SUBCONTRACTORS

APPENDIX H

CONTRACTORS AND SUBCONTRACTORS

CONTRACTORS AND SUBCONTRACTORS

Contractor/Subcontractor Name and Address	Contact Person/ Phone Number	Activity	Start Date	End Date
TBD				

APPENDIX I

TRAINING REPORTING FORM

Trained Contractor Personnel Log

Storm Water Management Training Log

Project Name: SCE EITP – Telecommunication Linear Construction Activities

Storm Water Management Topic: (check as appropriate)

- ❑ Erosion Control
- ❑ Sediment Control
- ❑ Wind Erosion Control
- ❑ Tracking Control
- ❑ Non-storm water management
- ❑ Waste Management and Materials Pollution Control
- ❑ Storm Water Sampling

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours):

Attendee Roster
(Attach additional forms if necessary)

Name	Company	Phone

COMMENTS:

Trained Contractor Personnel Log

(Insert any documentation of training here.)

Date	Training Type (ex. formal class, tailgate session, video)	Training Duration	Attendees

Note: Attach copies of sign-in sheets or other documentation of training (certificates, materials presented, agenda, etc.)

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Melanie Sotelo

December 16, 2010 – December 16, 2012

Certificate # 00225

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

John Slayton

December 10, 2010 – December 10, 2012

Certificate # 00229

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Alan Batdorf

January 11, 2011 – January 11, 2013

Certificate # 00221

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

California Stormwater Quality Association and
California Construction General Permit Training Team

The CPESC® Application Review Committee
certifies that

Matthew M. Renaud

Subscribes to the Code of Conduct and Ethics and has met the requirements established by the CPESC Council as a

Certified Professional in Erosion and Sediment Control™

An EnviroCert International, Inc. Program

Certification Number: 6156

Certification Date: December 14, 2010

Donald W Lake Jr.
Chair, CPESC Council

Gina Burleson
CPESC Program Manager

The CPESC Program was established in 1982.

The CESSWI™ Application Review Committee
certifies that

Michael William O'Hearn

Subscribes to the Code of Conduct and Ethics and has met the requirements established by the CESSWI Council as a

Certified Erosion, Sediment and Storm Water Inspector™

An EnviroCert International, Inc. Program

Certification Number: 1024

Certification Date: July 1, 2010

Susan A Clarke
Chair, CESSWI Council

Glenda Carmney
CESSWI Program Manager

The CESSWI Program was established in 2007.

APPENDIX J

MONITORING AND REPORTING PROGRAM RECORDS:

1. Construction Site Inspection Form
2. Stormwater Monitoring and Reporting Forms
3. Visual Inspection Field Log Sheet
4. Pollutant Testing Guidance Table

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	Yes	No	N/A	Corrective Action/Location
Temporary Erosion Controls				
Does the applied erosion control provide 100% coverage for the required areas?				
Are there any non-vegetated areas that need erosion control?				
Is the area where erosion control is required free from visible erosion?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, or mulching?				
Are there any areas of the site that are disturbed, but will likely lie dormant for over 14 days?				
Do any erosion control BMPs require maintenance?				
Temporary Sediment Controls				
Are temporary sediment controls functional, maintained properly, and installed in accordance with the details and/or the SWPPP Map?				
If not, do any sediment control BMPs require maintenance?				
Are temporary sediment controls free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced according to the SWPPP Map?				
Are fiber rolls installed and maintained on required slopes in accordance with the details, functional and maintained?				
Are silt fences placed on level contours?				
Storm Drain Inlet Protection				
Are storm drain inlet BMPs internal to the project installed and maintained properly, according to the storm drain inlet BMP Fact Sheet located in the SWPPP report?				
Similarly, are offsite storm drain inlet BMPs installed and maintained properly?				
Stockpiles				
Are stockpiles covered and protected from run-on, run-off from adjacent areas, and from winds?				
Are stockpiles covered and located at least 50 feet from concentrated flows, downstream drainage courses and storm drain inlets?				
Have soil stockpiles that will sit for over 14 days been stabilized?				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Tracking Control				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	Yes	No	N/A	Corrective Action/Location
Does the project have a stabilized construction site entrance/exit and is it installed correctly according to the SWPPP?				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed according to the SWPPP?				
Dust Pollution Control				
Is dust control implemented?				

Dewatering Operations				
Is dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Vehicle and Equipment Fueling, Cleaning and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 50 feet away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Waste Management & Materials Pollution Control				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 50 feet from concentrated flows and downstream drainage facilities?				
Are material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and water tight?				
Do temporary concrete washout facilities prevent concrete residues from entering the drainage system?				
Are the temporary concrete washout facilities' liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters with lids?				
Are trash receptacles provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Are waste management receptacles free of leaks?				
Is the site free of litter?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Are portable toilets placed within containment to prevent the discharge (leaking) of pollutants?				
Spill Control and Response				
Are there proper spill clean-up materials, and posted spill-reporting procedures for hazardous materials and wastes in open and accessible locations adjacent to storage areas?				
If a spill has occurred, was the Environmental Specialist contacted within 24 hours of a spill of a hazardous substance?				
Non-Storm Water Discharges				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Environmental Specialist been notified?				
If there has been an unauthorized or non-storm water discharge, has it been immediately contained, cleaned up and documented in the SWPPP?				
Are there any other potential non-storm water pollution control concerns at the site?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	Yes	No	N/A	Corrective Action/Location
Discharge Points				
Are discharge points and discharge flows free from noticeable pollutants?				
Are discharge points free of any significant erosion and deposition?				
General Questions				
Does the SWPPP adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown in the SWPPP Map also installed on the construction site?				
Is the SWPPP on-site where it is accessible to others?				
Is the NOI posted on-site?				
Does the SWPPP contain a current list of potential pollutant sources?				
REAP				
Was a Rain Even Action Plan (REAP) developed since the last inspection?				
Are there any other potential water pollution control concerns at the site?				
Storm Water Monitoring				
Is there a 50% chance of rain or greater in the forecast? (http://www.wrh.noaa.gov) Note: Print and attach NOAA forecast to this checklist.				
If this is a post-storm inspection, did the storm event produce precipitation of 0.5 inch or more?				
Are there any noticeable odors or visible sheen on the surface of any runoff or discharges?				

STORM WATER MONITORING AND REPORTING				
Parameter	Date	Time	Location	Result

PROJECT NAME:_____ DAILY INSPECTION LOG

DATE	INSPECTION CONDUCTED (Y/N)	IF YES DEFINE PROJECT AREA	IF NO STATE REASON	INSPECTOR NAME (LEGIBLE)

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Type 1
Visual Inspection Field Log Sheet

Date and Time of Inspection:	Report Date:

Inspection Type:	□ Weekly	□ Before predicted rain	□ During rain event	□ Following qualifying rain event	□ Contained stormwater release	□ Quarterly non-stormwater

Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations

Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate storm beginning: _____ (date and time)	Estimate storm duration:_____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes identify location		
Odors	Yes □	No □
Floating material	Yes □	No □
Suspended Material	Yes □	No □
Sheen	Yes □	No □
Discolorations	Yes □	No □
Turbidity	Yes □	No □

Site Inspections

Outfalls or BMPs Evaluated	**Deficiencies Noted**
(see attached detailed **Construction Site Inspection Checklists**)	

Was water quality sampling part of this inspection?	❒ Yes	❒ No

If YES, see the results on the final page of the inspection form.

Photos Taken:	Yes □	No □	Photo Reference IDs:

Corrective Actions identified to bring the site into compliance (note if SWPPP needs to be modified)

"I certify that this inspection form is true, accurate, and complete, to the best of my knowledge and belief."

Inspector Name:	Inspector Title:
Signature:	Date:

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Type 1

Sampling Field Log Sheet for Non-Visible Pollutants

Construction Site Name:	Date:	Time Start:
Sampler:		
Sampling Event Type:	□ Non-visible pollutant □ Other_____	

Field Meter Calibration

pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements

Location Description	pH	Turbidity	Time

Grab Samples Collected

Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Asphalt Products	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes – Black, solid material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter Acidity Test Kit	EPA 150.1 (pH) SM 2310B (Acidity) EPA 300.0 (Anion)
	Bleaches	No	Residual Chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	Phosphate	Phosphate	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Portland Concrete Cement and Masonry Products	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	pH	pH Meter	EPA 150.1 (pH)
			Alkalinity	Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	Methyl Methacrylate	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	Calcium Test	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter	SM 2310B (Acidity)
			Alkalinity	Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
			pH		EPA 150.1 (pH)
			VOC/SVOC		EPA 601/602 or EPA 624 (VOC)/ EPA 625 (SVOC)
Landscaping and Other Products	Aluminum Sulfate	No	Aluminum	TDS Meter	EPA 200.8 (Metal)
			TDS	Sulfate	EPA 160.1 (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	Sulfate	Sulfate	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic [4]	No	Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Phosphate	Phosphate	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	EPA 351.3 (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers-Organic	No	TOC	Nitrate	EPA 415.1 (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		EPA 351.3 (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required		
	Herbicide	No	Herbicide	None	Check lab for specific herbicide or

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Pesticide		**Pesticide**		pesticide
	Lime		Alkalinity	pH Meter Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
Painting Products	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	COD	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	COD	None	EPA 410.4 (COD)
	Solvents	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable - No Testing Required		
Contaminated Soil [5]	Aerially Deposited Lead[3]	No	Lead	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
	Other	No	Contaminant Specific	Contaminant Specific	Contaminant Specific
Line Flushing Products	Chlorinated Water	No	Total chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
Adhesives	Adhesives	No	COD	None	EPA 410.4 (COD)
			Phenols	Phenol	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)
Dust Palliative Products	Salts (Magnesium Chloride, Calcium Chloride, and Natural Brines)	No	Chloride	Chloride	EPA 300.0 (Chloride)
			TDS	TDS Meter	EPA 160.1 (TDS)
			Cations (Sodium, Magnesium, Calcium)	None	EPA 200.7 (Cations)
Vehicle	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid	Visually Observable - No Testing Required		

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
	Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
Soil Amendment/ Stabilization Products	Polymer/Copolymer [6, 7]	No	Organic Nitrogen	None	EPA 351.3 (TKN)
			BOD	None	EPA 405.1 (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	EPA 415.1 (DOC)
			Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes - Solids	Visually Observable - No Testing Required		
	Lignin Sulfonate	No	Alkalinity	Alkalinity	SM 2320 (Alkalinity)
			TDS	TDS Meter	EPA 160.1 (TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
			Nickel		EPA 200.8 (Metal)

Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
	Gypsum	No	pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Calcium	Calcium	EPA 200.7 (Calcium)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
			Manganese		
			Vanadium		
Treated Wood Products	Ammoniacal-Copper-Zinc-Arsenate (ACZA) Copper-Chromium-Arsenic (CCA) Ammoniacal-Copper-Arsenate (ACA) Copper Naphthenate	No	Arsenic	Total Chromium	EPA 200.8 (Metal)
			Total Chromium		
			Copper		
			Zinc		
	Creosote	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		

Notes:

1. If specific pollutant is known, analyze only for that specific pollutant. See MSDS to verify.
2. For each construction material, test for one of the pollutant indicators. Bolded pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.ysi.com and www.chemetrics.com for some of the test kits
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the contract documents for aerially deposited lead (ADL)
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by the State of California Department of Transportation (Caltrans), the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is **not** required: Super Tak™, M-Binder™, Fish Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

APPENDIX K

SOIL SALVAGE & STORAGE SPECIFICATIONS:

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Topsoil Salvage, Storage, and Protection

- Prior to excavation or grading and as part of the "Clearing and Grubbing" effort in areas containing natural vegetation subject to temporary disturbance during project construction, the contractor shall salvage and set aside topsoil and duff (vegetative debris) in appropriate areas for subsequent redistribution after project construction is complete in each affected area.
- The contractor shall prepare for and conduct the following activities in coordination with a qualified biologist (e.g., the project biological monitor). The contractor shall notify the biologist prior to conducting these activities.

Identify Clearing and Grubbing Limits & Minimize Disturbance Area.

- The contractor shall not disturb natural areas beyond clearance limits. Also, it may not be necessary to clear and grub the entire area established for each specific project element (e.g., tower site, pulling/splicing area, etc.) to the maximum extent of available clearance limits in order to provide adequate room for construction activities and maneuvering. As required by project mitigation measures, it is recommended that the contractor minimize disturbance areas.
- Slope areas that are steeper than 3:1 may not be appropriate for topsoil salvage or redistribution and such operations are not required.
- The contractor shall coordinate with the biological monitor to identify the limits of clearing and grubbing and to identify areas where topsoil salvage may be impractical as well as where salvaged topsoil and duff will be placed, as described in the next bullet item.

Determine Topsoil Storage Sites.

- The contractor shall identify areas for storing topsoil. Salvaged material shall be stored in linear piles, not more than 4' in height. It is recommended that material be placed as close as possible to the area from which it was removed, generally along the edge of construction on either side of the project element area or project ROW. The objective is to facilitate subsequent re-spreading of material back over the disturbed area.

Salvage Topsoil and Duff.

- **Biological Monitor.** Prior to commencing activities, the contractor shall request the project biologist to be present to assist with salvage operations and to provide direction where discretion is indicated and to observe that work area limits are respected.
- **Remove Large Debris.** Prior to salvaging material, large boulders, tree stumps, logs, or large pieces of woody debris (e.g., > 3 - 4' long and > 3 - 4" diam.) and trash items or construction debris (e.g., tires, metal, barb wire, concrete, etc.) shall be picked out of the material to be collected. Non-woody trash shall be legally disposed of offsite. Natural woody items (i.e.,

stumps, logs, and large branches) may be moved to or piled in appropriate areas on site subject to biological monitor notification and approval.

- **NOTE** Do Not Remove Live Cactus, Yucca, or Trees Without Approval.** Cactus and yucca specimens and/or trees to be removed shall be clearly marked by the project biologist. Unless marked, trees should be considered "Protect in Place".
- **Track-walking.** Areas containing natural vegetation and topsoil to be collected within construction limits may be "track-walked" (by a bulldozer) to crush vegetation.
- **Collect salvageable material.** The contractor shall scrape at least the top 6" to 8" of topsoil and crushed vegetative debris from the surface area and place in designated storage area and/or at the edge of the construction area.
- **Avoid collecting weed seed.** Material should not be salvaged from areas dominated by weedy vegetation, as indicated by the biological monitor.

Mark/Protect Salvaged Material from Equipment Operations.

- At minimum, the contractor shall place colored flagging, silt fence, orange "snow fence", colored polyethylene rope, or other obvious marking material that clearly identifies areas containing salvaged material and indicates that "Construction Equipment and Vehicles are Prohibited from Operating" in or driving through these areas.
- The contractor shall replace or repair any flagging or other marking material designating salvaged material to be protected in place that is dislodged or damaged during the construction.
- If conflicts between construction access needs and topsoil storage placement arise during construction, the contractor may be required to move stored topsoil and duff material to more appropriate locations subject to prior notification and coordination with the biological monitor.

Eldorado-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan
Eldorado Substation to Nipton Road at the CA/NV Border

Eldorado-Ivanpah Transmission Project

Stormwater Pollution Prevention Plan

Eldorado Substation to Nipton Road at the CA/NV Border

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STORMWATER GENERAL PERMIT NVR100000

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

FOR

ELDORADO-IVANPAH TRANSMISSION PROJECT

TELECOMMUNICATION CONSTRUCTION ACTIVITIES

FROM THE ELDORADO SUBSTATION

TO NIPTON ROAD AT THE CA/NV BORDER

CLARK COUNTY, NEVADA

APN 241-04-000-001

PERMITTEE* INFORMATION:

Southern California Edison (SCE)
14005 S. Benson Ave
Chino, CA 91710
Contact: John Slayton, CPESC
(310) 990-1745

PERSON RESPONSIBLE FOR IMPLEMENTING SWPPP:

Southern California Edison (SCE)
14005 S. Benson Ave
Chino, CA 91710
Contact: John Slayton, CPESC
(310) 990-1745

PREPARED BY

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CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL
CPESC AB
Alan Batdorf
No. 5823

SWPPP Preparation: August 2011

Notice of Intent Filing Date: August 8, 2011

Site ID: CSW-22519

* The Permittee is defined as the owner and/or operator of the construction site. This is the person that has operational control of the construction plans and specifications, or has day-to-day operational control of the activities necessary to ensure compliance with the SWPPP.

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I. Project Description

A. Description of the Proposed Construction Activity [§ III.A.1.f]

PURPOSE

This SWPPP has been prepared to provide coverage under the State of Nevada's Stormwater General Permit NVR100000. See Appendix A for a copy of the Notice of Intent and Permit. The SWPPP will address the activities described herein that comprise all construction within the State of Nevada.

Southern California Edison's (SCE) Eldorado-Ivanpah Transmission Project involves the construction, operation, and maintenance of new and upgraded transmission infrastructure along approximately 35 miles of new and existing rights-of-way (ROW) from the proposed Ivanpah Substation, located in eastern San Bernardino County, California, to the existing Eldorado Substation located approximately 15 miles southwest of Boulder City, in Clark County, Nevada.

The overall Project includes work associated with the connection and upgrades to the telecommunication path from the Eldorado Substation located in Clark County, NV to the border of California on Nipton Road. This SWPPP is prepared to address only the Project's land disturbing activity related to the improvements within the Nevada territory. (Refer to Appendix B for a general location of the Project.)

TELECOMMUNICATION CONSTRUCTION ACTIVITIES

An existing overhead ground wire will be replaced with new optical ground wire (OPGW) on an approximately 25-mile section of the existing Eldorado–Lugo 500-kV transmission line. The route extends from the Eldorado Substation (Clark County, NV) to a 500-kV tower (MP 152, tower 2) located along Highway 164, 4.8 miles east of the CA/NV border. Approximately 45 of the existing structures along this route will require some form of structural modification or maintenance to allow the replacement/ upgrade of the existing telecommunication line. All construction work related to the structure modifications will be performed within existing right-of-way (ROW), and are accessible via existing access roads.

Several locations along the SCE ROW will feature spooling and/or pulling sites where vehicles and equipment will be used to spool wire and/or pull wire between towers. The equipment will be set up in areas cleared by biologists of critical plants and animals.

Additionally, 5 miles of OPGW will be installed in an underground duct along the Eldorado–Lugo transmission line near the town of Nipton, CA, with approximately 2 miles located on the NV side. The underground duct will be installed in the shoulder of the existing roadside ROW, parallel to the north side of Nipton Road. The underground OPGW will be installed approximately 3 feet from the northerly edge of the existing AC pavement. The trench will be approximately 2 feet wide by 30 inches deep with the soil stockpiled for re-use (See Appendix C for SCE's procedures for Topsoil Salvage, Storage, and Protection). Two 5-inch ducts containing the fiber optic cables will be covered with concrete slurry and the trench backfilled with the existing stockpile of soil. Any unused soil will be removed for proper disposal. On the opposite side of the Project, the Eldorado–Lugo 500-kV transmission lines will have an underground and overhead dip into the new 220 kV to 500 kV racks at the Eldorado Substation involving approximately 1 mile of trenching activities. The following section provides the disturbed area for trenching activities. Refer the Site Map(s) in Appendix B for the respective locations of land disturbance activities.

PROJECT DISTURBED AREA

Tower/Site (sq. ft.)	Wire Spool/Pull	Disturbed Area
Eldorado Substation	P-1	5,400
M176-T1	W-1, P-2	10,800
M173-T1	W-2, W-3	10,800
M170-T4	P-3, P-4	10,800
M167-T2	W-4, W-5	10,800
M164-T1	P-5, P-6	10,800
M160-T5	W-6, W-7	10,800
M157-T2	P-7, P-8	10,800
M155-T2	P-9, W-8	10,800
M152-T2	W-9	5,400
Total =		**97,200 sq. ft.**

Trenching Activities. Trenching from Tower M152-T2 to the CA/NV border will be approximately 2.1 miles with a disturbed area of approximately **44,400 sq. ft.** Trenching to connect transmission lines to the Eldorado Substation will be approximately 1 mile with a disturbance area of **10,560 sq. ft.**

Total Project Disturbed Area = 152,160 sq. ft., or 3.5 acres.

OFF-SITE MATERIALS STORAGE AND MAINTENANCE

This Project will utilize an established off-site material storage yard. The existing yard, referred to as the Eldorado Material Storage Yard, is located at the Eldorado Substation and is not included in this Project's Stormwater permit coverage. The following is a list of activities that will be addressed at the Eldorado Materials Storage Yard:

- Construction materials delivery,
- Construction materials storage,
- Vehicle and equipment storage,
- Vehicle and equipment maintenance,
- Vehicle and equipment cleaning, and
- Vehicle and equipment fueling.

Total Area of Site (acres)	3.5 Ac
Total Area to be disturbed by excavation, grading, or other construction activities including on and off-site borrow and fill areas (acres) [§ III.A.1.h]	3.5 Ac

B. Intended Sequence of Major Soil Disturbing Activities [§ III.A.1.g] (include dates when these activities occur.)

A project schedule has been developed and is provided below. BMP deployment will begin concurrently with ground disturbance activities. The schedule includes the following:

Estimated Construction Start: 9/01/2011

Estimated Construction End: 8/30/2012

C. Existing Soil and Water Quality Data [§ III.A.1.i]

Provide a description of the existing soil and/or water quality data of any discharges from the site, if available. Water quality data for adjacent waterways that may receive discharges from the site is also recommended.

Per the Eldorado to Ivanpah Transmission Project (EITP) Final Environmental Impact Report/Final Environmental Impact Statement (November, 2010), *"Although ephemeral streams and washes do not have beneficial use designations assigned by the states of California and Nevada, these systems do provide natural distribution of water and sediments on floodplains, recharge for groundwater in the region, and a sporadic but local water supply for wildlife. No information is available on the surface water quality at the site during rain events, but the nature of the flooding that occurs there would tend to result in flood waters of high turbidity. Highly turbid waters would be more able to contain any contaminants that had been present on the soil surface. As this is a rural, undeveloped area, anthropogenic contaminants on the surface are expected to be low to non-existent."*

D. Runoff Coefficients [§ III.A.1.i].

Use the following worksheet for sites with only 1 or 2 land uses, such as an undeveloped site with a proposed parking lot. For sites with 3 or more land uses (pre and/or post-project) attach a separate worksheet.

1. Describe Pre-Project Conditions and Land Use(s)

Project is located along 25 miles of existing electrical ROW in rural area of Nevada. The project area is approximately 98% pervious. The proposed project will result in a post-development condition matching the pre-development condition; therefore the Project is not expected to result in modification to the run-off coefficient.

2. Pre-Project Land Use	**Coefficient**		**Acres (A1)**		**C1**
Undeveloped with existing utilities	0.20	x	3.5	=	0.7
3. Pre-Project Land Use 2	**Coefficient**		**Acres (A2)**		**C2**
N/A	0	x	0	=	0
4. Average Pre-Project Runoff Coefficient			**(C1 + C2) / (A1 + A2) =**		**0.20**
5. Post-Project Land Use 1	**Coefficient**		**Acres (A3)**		**C3**
Undeveloped with existing utilities	0.20	x	3.5	=	0.7
6. Post-Project Land Use 2	**Coefficient**		**Acres (A4)**		**C4**
N/A	0	x	0	=	0
7. Average Post-Project Runoff Coefficient			**(C3 + C4) / (A3 + A4) =**		**0.20**

II. Site Layout Maps

Attach the Following:

A. General Location Map showing nearby roads and highways [§ III.A.1.j.]

B. Detailed Site Map [§ III.A.1.j.i. – xiii.] ***updated and revised as site conditions change, new BMPs are implemented, and areas are stabilized.***

1. The Detailed Site Map must be drawn to scale and indicate the following:
2. Existing and proposed topography, including drainage patterns and approximate slopes.
3. Areas where soils will be disturbed and areas that will not be disturbed.
4. Locations of onsite and offsite soil borrow and stockpile areas.
5. Locations of major structural and non-structural BMPs identified in this SWPPP.
6. Locations where stabilization practices will be applied.
7. Locations where vehicles and equipment will be stored and maintained.
8. Locations of onsite and offsite material and waste storage areas.
9. Locations of concrete washout areas.
10. Locations and aerial extent of all surface waters (including ephemeral water bodies, dry washes and wetlands) that may receive discharges from the disturbed areas of the project.
11. Locations where storm water discharges will enter surface waters, the municipal storm drain system and/or ephemeral waters or dry washes at or near the site.
12. Location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt or concrete plants;
13. Areas where final stabilization has been accomplished;
14. A legend describing all symbols, BMP numbers and abbreviations used on the map.
15. A north arrow and a map scale.

C. Industrial Discharges [§III.A.1.j.xi]

Provide the location and description of any discharge(s) associated with industrial activity other than construction, including any storm water discharges from dedicated asphalt or concrete plants covered under General Permit NVR100000.

Not applicable.

III. Receiving Waters

A. Receiving Water(s) Identification [§III.A.1.j.xii]:

Identify the name and location of the streams, rivers, ditches, drainages, lakes, wetlands (both perennial and intermittent), or other special aquatic sites that will be disturbed or will receive runoff from the construction site. If the site will drain to the municipal storm drain system, identify the receiving water to which the system discharges.

The proposed Project is located in the Central Region and crosses many ephemeral streams. Runoff, if any, has the potential to drain to the Eldorado Northern Basin (164), the Jean Lake Basin (165), and the Ivanpah Basin (164A), where groundwater recharge will occur primarily via percolation.

B. 303(d) Impaired Water Body Listing [§III.A.10.b]:

Check the current 303(d) listing of Impaired Water Bodies, issued by the Nevada Division of Environmental Protection (http://ndep.nv.gov/bwqp/standard.htm). If any of the receiving waters noted above appear on the 303(d) list, describe: a) the condition for which the water body has been listed, b) whether discharges from the site will contribute significantly to any 303(d) listing, and c) the BMPs that will be implemented to ensure that discharges from the site will not cause or contribute to an exceedance of State water quality standards.

There are no 303(d) listed water bodies associated with this Project.

C. Total Maximum Daily Load (TMDL) requirements [§III.A.10.b]:

Does the construction site discharge runoff into a water body with an established TMDL?

☐ **YES** ☒ **NO**

Describe the BMPs that will be applied to comply with all applicable TMDL requirements

There are no established TMDLs for water bodies associated with this Project.

IV. BMP Implementation

A. Storm Water Best Management Practices (BMPs)

Describe each storm water control measure and the general sequence of implementation during the construction process. Clearly identify the BMPs that will be used for each of the major soil-disturbing activities identified in Section I.B, above [§ III.A.2].

Describe the design, installation and maintenance of each BMP, and indicate the parties that will be responsible for carrying out these functions for each control measure. Control measures must be properly selected, installed, and maintained in accordance with the manufactures specifications and good engineering practices.

Offsite material storage areas used solely by the permitted project must also be addressed [§ III.A.3].

This Project will follow the BMP installation and implementation guidance pursuant to the 2009 CASQA Construction BMP Handbook and utilize SCE's procedures for Topsoil Salvage, Storage, and Protection. Corresponding BMP guidance and topsoil procedure materials are located in Appendix C. The following is a list of general good housekeeping BMPs to be implemented by SCE for the Project. Project-specific BMP installation and implementation details are described in Sections IV.B-F and V.A-G.

	Note: Before soil disturbance activities occur photographs shall be taken to document the pre-disturbed conditions.
1.	Identify the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

2.	Cover and berm loose stockpiled construction materials that are not actively being used.
3.	Store chemicals in water tight containers (with appropriate secondary containment to prevent any spillage and leakage in a completely enclosed storage shed.
4.	Minimize exposure of construction materials to precipitation.
5.	Implement sweeping to prevent off-site tracking of loose construction materials.
6.	Prevent the disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain.
7.	Ensure the containment of sanitation facilities to prevent discharges of pollutants to the storm water drainage system or receiving water.
8.	Regularly inspect sanitation facilities and clean or replace them as needed.
9.	Cover waste disposal containers at the end of every business day and during rain events.
10.	Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.
11.	Contain and securely protect stockpiled waste materials from wind and rain at all times unless actively being used.
12.	Implement procedures to effectively address hazardous and non-hazardous spills.
13.	Maintain equipment and materials for clean-up of spills on site. Contain leaks and clean up spills immediately. Properly dispose of all spilled materials.
14.	Contain all washouts so that there is no discharge into the underlying soil and onto the surrounding areas.
15.	Prevent oil, grease, or fuel from leaking onto the ground, and into storm drains, or surface waters.
16.	Immediately clean up all leaked material and dispose of properly.
17.	Contain stockpiled materials when they are not actively being used.
18.	Implement measures to control all non-storm water discharges during construction.
19.	Limit washing vehicles on site to emergency situations only. Prevent non-storm water discharges from vehicle washing from reaching surface waters or the MS4 drainage system.
20.	Prevent un-authorized non-storm water discharges from reaching surface waters or the MS4 drainage system when cleaning streets.
21.	Provide soil cover for areas of construction that have been disturbed and are not scheduled to be re-disturbed for at least 14 days and for all finished slopes, open space, utility backfill, and completed lots.
22.	Limit the use of plastic materials when more sustainable environmentally friendly alternatives exist.
23.	Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to control erosion and sediment discharges from the site.
24.	Conduct regular storm water tailgate meetings with the workforce when the project is staffed and work is underway.
B. Temporary Soil Stabilization Practices [§ III.A.5]	
Describe the interim or temporary stabilization BMPs (e.g. soil binders, revegetation and/or mulching) that will be provided on stockpiles and disturbed portions of the site where construction activity is	

expected to cease for 14 days or more and will not be resumed within 21 days.

Based on the nature of the Project, it is not anticipated that construction activity will cease for 14 days or more at any location along the Project route. Construction activities will be scheduled such that any disturbed areas will undergo construction until final stabilization is complete.

WM-3 Stockpile Management

This Project will utilize the Eldorado Material Storage Yard as the primary location for stockpiles. However, if any field located construction material stockpiles occur outside of the designated Material Storage Yard, this BMP shall be implemented stockpile management will be used for all SCE field located construction material and/or soil stockpiles. Stockpiles will be located away from concentrated flows of Stormwater and drainage courses. All stockpiles will be covered and protected with perimeter sediment control (i.e. fiber rolls or gravel bags) prior to the onset of precipitation. Based on construction progression SCE shall update the Site Map to show the respective locations. Also, see Appendix C for SCE's procedures for Topsoil Salvage, Storage, and Protection.

C. Permanent Soil Stabilization Practices [§III.A.5]

Describe the permanent stabilization BMPs (e.g. permanent revegetation and/or rolled erosion control products) that will be provided on disturbed portions of the site where construction activities have permanently ceased.

As construction progresses and portions of the linear construction are completed, said portions will be returned to match the predevelopment conditions. As necessary, nominal re-vegetation will be utilized to replant native species under the direction of the project biologist(s).

D. Structural Practices [§ III.A.6]

Provide a description of the temporary and permanent erosion and sediment control BMPs (e.g. silt fences, fiber rolls, earth dikes, drainage swales, check dams, sediment traps, storm drain inlet protection, etc.) that will be used during construction to divert flows from exposed soils, and/or temporarily store flows and limit runoff from the exposed areas of the site.

For common drainage locations serving areas with ten (10) or more acres of disturbed soils, sediment basins shall be provided until final stabilization of the site. Sediment basins must be designed to the criteria outlined in the Truckee Meadows Construction Site BMP Handbook. From May to October, water must not be allowed to pond in any structural practice in excess of 7 days.

Velocity dissipation devices (e.g. rock outlet protection, channel lining, etc.) must be placed at storm drain pipe outfall locations and along the length of channels to reduce flow velocities and prevent erosion and degradation of receiving waters.

Pursuant to State and Federal regulations, the site erosions and sediment BMPs will be inspected for necessary repairs or replacement every 7 days and after each rain fall event of 0.5 inches or more.

EROSION CONTROLS

EC-1 Project Scheduling

Scheduling is an erosion control BMP that consists of the development of a written plan that includes sequencing of construction activities and the implementation of BMPs, such as erosion control and sediment control, while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and

vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule described in Sections I.B and VIII.A

EC-2 Preservation of Existing Vegetation

SCE shall protect and preserve existing vegetation in work areas as long as practicable before disturbing them. Also, SCE shall preserve and protect existing vegetation adjacent to work areas. The protection and preservation of such vegetation will serve to control erosion and filter out sediment. See Appendix C for SCE's procedures for Topsoil Salvage, Storage, and Protection.

SEDIMENT CONTROLS

SE-5 Fiber Rolls

Fiber roll linear barriers for perimeter protection, in combination with SE-5, will be applied throughout SCE's work areas; around tower maintenance and replacement sites, around trenching activities, down-slope from exposed soil areas, and around temporary stockpiles, as necessary. Linear barriers shall be maintained to provide adequate sediment holding capacity. These linear barriers will be placed to prevent sheet flow from running uninterrupted into areas of the Project under active construction. Barriers shall be removed from the Project areas when no longer required. SCE shall update Site Map as appropriate.

Fiber roll barriers shall be secured (staked) to the ground in a trench depth of 1/4 to 1/3 of the thickness of the roll, and a width of the diameter of the roll. The area behind the fiber rolls will collect and hold runoff in order to allow suspended sediment to settle out. SCE will remove this sediment periodically, and especially after heavy rains. Fiber rolls, which become clogged with sediment, will be replaced as necessary to ensure the free flow of water.

SE-6 Gravel Bag Berm

Gravel bag linear barriers for perimeter protection, in combination with SE-5, will be applied throughout SCE's work areas; around tower maintenance and replacement sites, around trenching activities, down-slope from exposed soil areas, and around temporary stockpiles as necessary. Linear barriers shall be maintained to provide adequate sediment holding capacity. These linear barriers will be placed to prevent sheet flow from running uninterrupted into areas of the Project under active construction. Barriers shall be removed from the Project areas when no longer required. SCE shall update Site Map as appropriate.

E. Post-Construction Storm Water Management Controls [§ III.A.7]

Provide a description of the permanent measures that will be installed during construction to control pollutants in storm water discharges that will occur after construction is complete. These permanent storm water management BMPs include structural treatment controls and Low Impact Development (LID) practices such as vegetated swales, landscape detention, sedimentation basins, and sand filters (refer to the Truckee Meadows Structural Controls Design Manual and LID Handbook). Permittees are responsible for the installation and maintenance of these storm water BMPs until an approved Notice of Termination is received by NDEP. The installation of these devices may also require a separate NPDES permit.

This Project relates solely to linear construction activities. Permanent structures associated with the development are described in Section I.A. There are no post-construction storm water management controls proposed for this Project. The proposed project will result in a post-development condition matching the pre-development condition.

F. Non-Storm Water Discharge Management [§ III.A.8.]

Provide a description of the activities that may produce non-storm water discharges, the measures used to reduce or eliminate non-storm water discharges, and the BMPs used to minimize pollutants in any non-storm water discharges that may occur. Non-storm water discharges include, but are not limited to water line flushing, vehicle or building wash-down, and dewatering from excavation (see §I.D.2 for a full list).

ACTIVITIES PRODUCING POTENTIAL NON-STORMWATER DISCHARGES

The following is a list of construction activities that will be performed which may have the potential to contribute to sediment in storm water discharges:

- Clearing and grubbing operations
- Rough grading operations (if necessary)
- Tower improvement/maintenance activities
- Dry utility installations
- Trenching/excavation operations
- Concrete placement operations

AUTHORIZED DISCHARGES

An operator may discharge the following non-stormwater discharges, provided they are not a significant source of pollutants and the operator implements appropriate BMPs to minimize pollutants discharged:

a. Discharges from fire-fighting activities. Although fire-fighting drainage may contain significant pollutant concentrations, the frequency of discharge is low and the discharge and is hereby authorized out of necessity;
b. Fire hydrant flushing;
c. Water used to wash vehicles where detergents are not used;
d. Water used to control dust, provided effluent or other wastewaters are not used;
e. Potable water sources including water line flushing;
f. Routine external building wash down where detergents are not used;
g. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
h. Uncontaminated air conditioning or compressor condensate;
i. Uncontaminated groundwater or spring water;
j. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
k. Potable water well flushing where the receiving waters are ephemeral;
l. Water used for compacting soil, provided effluent or other wastewaters are not used
m. Water used for drilling and coring such as for evaluation of foundation materials, where flows are not contaminated with additives; and
n. Water obtained from dewatering operations of foundations in preparation for and during excavation and construction that will have flows of 300 gallons per minute ("gpm") or less for thirty (30) days or less.

NON-STORMWATER BMP CONTROLS

The following BMPs have been selected to control non-storm water pollution for the Project:

NS-1 Water Conservation Practices

SCE shall use water in a manner, which will not cause erosion or transport pollutants offsite. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

NS-12 Concrete Curing

Discharges of stormwater and non-stormwater exposed to concrete curing may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-12, to reduce or eliminate the contamination of stormwater runoff during concrete curing operations.

NS-13 Concrete Finishing

Discharges of stormwater and non-stormwater exposed to finishing operations may have a high pH and may contain chemicals, metals, and fines. SCE will employ proper procedures, pursuant to BMP NS-13, to reduce or eliminate the contamination of stormwater runoff during concrete finishing operations.

V. Other Controls

A. Material Storage, Spill Prevention and Response [§ III.A.9.a]

Provide a description of the construction materials and chemicals that are expected to be stored onsite, with updates as appropriate. Describe the BMPs that will be provided to ensure proper storage of these construction materials that will minimize their exposure to storm water. Describe the response measures that will be provided if a spill occurs.

The following is a list of construction materials that will be used which may have the potential to contribute to pollutants in storm water discharges.

- Vehicle fluids, including oil, grease, petroleum, and coolants
- BMP materials
- Treated lumber (materials and waste)
- General litter
- Wood products
- Metals and plated products
- Cement materials associated with PCC concrete paving operations
- Base and sub base material

The BMPs that have been selected for handling construction materials are:

WM-2 Construction Material Use

As per Section I.A., material storage will be conducted off-site at the Eldorado material storage yard. However, smaller areas of construction material usage may be located at various locations along the linear route depending upon current operations and materials being handled. SCE will implement

controls to help prevent discharges of construction materials during use. SCE will utilize stabilized areas, as necessary, to prevent potential spills and unnecessary tracking of sediment. Spill clean-up materials, material safety data sheets, material inventory, and emergency contact numbers will be maintained and stored onsite by SCE, and made available upon request. Also see Appendix C for SCE's procedures for Topsoil Salvage, Storage, and Protection.

The following BMP has been selected to be implemented to control and prevent spills and clean up any spills at the construction site:

WM-4 Spill Prevention and Control

SCE shall implement this BMP when chemical and/or hazardous substances are used or stored in Project areas, to control, clean up, and prevent spills and discharges to storm drain systems. SCE will have equipment and spill clean-up materials available on-site, including, but not limited to shovels, brooms, spill absorbent, rags, and proper waste containment (i.e. non-permeable, water proof spill containment bin). Waste materials shall be labeled and disposed of properly in accordance with local, state, and federal requirements.

SCE will ensure that spill response personnel are assigned and trained. Spills of oil, petroleum products, and substances listed under 40 CFR parts 11, 117.3, and 302.4, those defined by Nevada regulation or statute, and sanitary and septic wastes shall be contained and cleaned up immediately. Equipment and materials for cleanup of spills shall be available onsite. Waste materials shall be disposed of properly in accordance with local, state, and federal requirements.

Note: For this Project, **Double Barrel Environmental Services** has been identified, by SCE, as the primary spill clean-up responder, as well as for other waste discharge incidents.

The notification process will be from the person or entity causing or discovering the incident to the SCE–TDBU SWPPP Coordinator, John Slayton, then to the on-call TDBU E-SES (via the SCE operator) and finally to Double Barrel Environmental Services. There is always the possibility that Double Barrel Environmental Services may get a call directly from any of the preceding, and Double Barrel Environmental Services has been requested to take the call, and then to confirm with the on-call E-SES the person making the notification to them.

- John Slayton's Cell Phone Number: 310-990-1745
- TDBU E-SES Contact Number: 626-302-1212 (Ask for On-Duty TDBU Environmental Specialist)
- Double Barrel Environmental Services : 951-683-6994 (Dispatch 24 hr. Contact)

B. Offsite Vehicle Tracking Controls [§ III.A.9.b]

Provide a description of the control measures that will be provided to prevent tracking or deposition of sediments offsite and the measures that will be used to remove any sediments that have been deposited on the paved roadways bordering the site.

SE-7 Sediment Sweeping and Vacuuming

SCE will implement sweeping and vacuuming, as to control sediment that is tracked from the Project construction areas onto public roads. This will limit the amount of sediment that may be transported to storm drains or watercourses.

C. Dust Control [§ III.A.9.b]

Describe the control measures that will be used to prevent the generation of dust on-site.

WE-1 Wind Erosion Control

Many local agencies, including the local air quality management authority, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act.

This BMP, along with NS-1 – Water Conservation Practices, will be implemented to provide Dust Control and prevent discharges from dust control activities and water supply equipment. Water will be applied to disturbed soil areas of the Project to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Water equipment leaks will be repaired immediately. Water application rates will be minimized, as necessary, to prevent runoff and ponding.

D. Construction Waste Storage and Disposal [§ III.A.9.d]

Describe the wastes that will be generated onsite. Construction wastes include concrete washout, excess building materials, chemicals, litter and debris. Describe the BMPs that will be used to temporarily store these wastes, how they will be collected and disposed, and the response measures that will be provided if a spill occurs.

The following is a list of solid or construction wastes that will be created which may have the potential to contribute to pollutants in storm water discharges.

- Electrical wiring, cuttings, and related materials;
- Solid waste generated from removal of trees and shrubs
- Packaging materials including wood, paper, Styrofoam, and plastic
- Scrap metals
- Food wastes
- Timber
- Non-hazardous equipment parts
- Hazardous wastes
- Concrete wastes

The BMPs that have been selected to control construction wastes are:

WM-5 Solid Waste Management

SCE shall implement this BMP whenever wastes are generated, stockpiled, or removed from the Project. Due to windy conditions occurring often in the Project area, trash should be collected daily, at a minimum, and placed in waste containers. Implementation of this BMP will minimize or eliminate the discharge of pollutants to the storm drain systems or watercourses.

This BMP will be implemented to minimize storm water contact with waste materials and prevent waste discharges. Waste containers shall be equipped with functional lids and covered at the end of every business day and during rain events. Solid waste, including rubble stockpiles, will be removed and disposed of at appropriate offsite facilities weekly

WM-8 Concrete Waste Management

Project concrete washout facilities shall be located at the Project's designated material storage yard.

Washouts shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by any Project washout operations. Concrete washout facilities will be field located and placed a minimum of 50 feet from storm drain inlets, open drain facilities, water courses, and apart from construction traffic areas. A sign shall be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities. SCE will update the Site Map to show respective locations.

NS-9 Vehicle and Equipment Fueling Management

All vehicle and equipment fueling shall be performed in the Project's designated material storage area and this BMP will be utilized to manage any mobile fueling activities which may occur outside of the material storage area, if needed. Fuel trucks, each equipped with absorbent spill clean-up materials, will be used for any mobile fueling elsewhere on the Project. All mobile fueling operations will be conducted at least 50 ft away from drainage courses and on a level graded area. Drip pans will be used for all mobile fueling.

E. Hazardous and Sanitary Waste Storage and Disposal

Provide a description of the hazardous and/or sanitary wastes that are expected to be generated at the site, the measures used to temporarily store these wastes, how they will be collected and disposed and the response measures that will be provided if a spill occurs.

WM-9 Sanitary/Septic Waste Management

SCE shall minimize or eliminate the discharge of construction sanitary/septic wastes. This BMP is applicable to temporary and portable sanitary/septic systems on construction sites and associated areas. Portable toilets will be placed within the Projects designated material storage yards. Should locations change, or if additional portable toilets are necessary, SCE shall update the Site Map to reflect their location. Weekly maintenance shall be provided and wastes will be properly disposed of at appropriate offsite facilities. The toilets shall be located away from concentrated flow paths and traffic flow.

WM-7 Contaminated Waste Management

Project areas have no known history of contaminated soil or other impairments. However, SCE shall utilize contaminated soil management to address the possibility of construction activities occurring near contaminated soils. SCE shall instruct employees to recognize evidence of contaminated soil such as buried debris, discolored soil, and unusual odors.

WM-6 Hazardous Waste Management

SCE shall implement this BMP to prevent or reduce the discharge of hazardous materials to stormwater or watercourses while conducting construction activities. Removed transmission materials shall be properly contained and disposed of and SCE shall place hazardous materials generated from Project activities (e.g. sawdust, debris, etc.) in appropriate temporary containment, as needed, and provide training of employees and subcontractors. Temporary containment shall be covered during non-working days, and prior to rain events.

F. Offsite Discharges [§ III.A.9.e]

Provide a description of the potential offsite pollutant sources and the BMPs that will be provided to minimize storm water pollution from these sites. Offsite sources may include dedicated sites such as

asphalt or concrete plants.
The Project is located in the existing electrical ROW in a rural area of Nevada. Off-site sources of pollution are not expected; however, the Project will utilize perimeter controls as described in Section IV.D herein.
6. Soil Stabilization at Culverts [§ III.A.9.c]
Provide a description of the measures used to sufficiently stabilize soil at culvert locations to prevent the formation of rills and gullies during construction.
The Project is located in the existing electrical ROW in a rural area of Nevada. Culverts are not a project feature.

VI. Inspection/Maintenance Procedures

The contractor or his qualified agent is required to routinely inspect all areas of disturbed and bare soil, areas used for storage of materials and equipment that are exposed to precipitation, onsite vehicle entrance and exit locations and all onsite erosion and sediment control BMPs. Inspectors must also observe discharge locations to receiving waters to ensure proper operation of sediment and erosion control measures. **Inspections shall occur weekly, prior to forecasted rain events, and within 24 hours after any actual rain event of 0.5 inches or greater.** Sediments must be removed when the BMP design capacity has been reduced to 50%. Construction materials, chemicals, wastes, litter and debris must be prevented from becoming a storm water pollutant source. When sediment escapes the construction site, off-site accumulations of sediment must be removed to ensure no adverse effects on water quality and public safety [§ III.A.4]

The following sources will be used to obtain weather forecasts:

- The National Weather Service: Telephone: (775) 673-8100, **http://www.wrh.noaa.gov/Reno/**
- The Western Regional Climate Center, **http://www.wrcc.dri.edu/CURRENTOBS.html**
- The Weather Channel, **http://www.weather.com/weather/local/USNV0076?from=search_city**

Once storms are imminent, a portable NOAA weather radio can also provide useful information. NOAA weather radio broadcasts are made on one of seven high-band FM frequencies. These frequencies are typically available only on radios that provide a "weather band" as an added feature or portable weather radios that exclusively provide weather broadcasts. The local FM frequency for the Reno/Sparks area is 162.500 MHz. Taped weather messages are repeated every four to six minutes and are routinely revised at least once every one to three hours, 24 hours daily.

A. Inspection and Maintenance of Best Management Practices [§III.A.11-12]
Provide a description of the practices that will be used to inspect and maintain all Temporary and Permanent Stabilization Practices Structural Practices, Post-Construction Storm Water Management Controls and Non-Storm Water Discharges described in Section IV, above. Maintenance shall be performed if any BMP is not operating effectively or if the capacity has been reduced by 50%. Maintenance must be conducted as soon as practicable and before the next anticipated storm event.

Inspections must include all areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation. Inspectors will look for evidence of, or the potential for, pollutants entering the drainage system.

Inspection observations will be recorded on the forms provided in Appendix D and maintained in the onsite copy of the SWPPP. See Section VIII.B. for inspection record keeping details.

ROUTINE INSPECTIONS

SCE will implement weekly routine inspections to ensure the BMPs are functional and that the SWPPP is being properly implemented. In the event that weekly inspection observations identify BMPs that are not operating effectively or if the capacity has been reduced by 50%, maintenance will be performed before the next anticipated storm event, and within no longer than 72 hours.

POST-STORM EVENT INSPECTIONS

SCE will implement post-storm event inspections within 24 hours of the end of a storm event of 0.5 inches or greater. SCE will inspect accessible, field located discharge points to observe if control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations will be inspected as practicable.

B. Inspection and Maintenance of Other Controls [§III.A.11-12]

Provide a description of the practices that will be used to inspect and maintain all Other Controls described above in Section V,

Not applicable. Controls described herein this SWPPP will be inspected and maintained in the manner described here in Section VI.A.

C. Inspector Qualifications [§III.A.12c]

Describe the qualifications of the person(s) selected to inspect the BMPs discussed above. "Qualified Personnel" means someone knowledgeable in the principles and practice of erosion and sediment control who possess the skills necessary to assess the site conditions and the effectiveness of BMPs.

SCE will provide qualified personnel to inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site. SCE's selected "Qualified personnel" will be knowledgeable in the principles and practice of erosion and sediment controls and possesses the skills to assess conditions at the site that could impact stormwater quality and the effectiveness of the BMPs selected to control the quality of the stormwater discharges.

The following is a list of the qualified personnel selected to conduct site inspections:

Matt Renaud, CPESC
AEI-CASC Consulting
18 Technology Drive
City, State, Zip: Irvine, CA 92618
Phone: (949) 453-1783
Fax: (949) 453-1860
Emergency Phone: (818) 263-3566
mrenaud@aei-casc.com

Additionally, a list of SCE Responsible Parties and Contact Information is provided in Appendix F.

Appendix G contains a list of contractors and subcontractor for the Project.

VII. Certifications of Compliance

This SWPPP must be certified that it is consistent with all applicable Federal, State and Local regulations, or other approved site plans or permits. It is to be prepared in accordance with the latest version of the Truckee Meadows Construction Site Best Management Practices Handbook. This SWPPP must be updated as necessary to remain consistent with changes in other site plans that effect soil disturbing activities, site drainage patterns or any other activity that may impact storm water runoff quality. It must also be re-certified annually by July 1 until the construction project is complete and a Notice of Termination has been submitted to NDEP.

A. OWNER/OPERATOR CERTIFICATION STATEMENT [§ V.B.1.d]

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I also confirm that a storm water pollution prevention plan (SWPPP) has been completed, will be maintained at the project site from the start of construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines for knowing violations.

Initial Certification:	
Print Name:	Title:
Signature:	Date:
Annual Re-Certification	
Print Name:	Title:
Signature:	Date:

All contractors and subcontractors responsible for implementing pollution control measures must be identified in this SWPPP with the measures for which they are responsible. They must also sign the following certification statement that indicates they understand the requirements of the attached General Permit for Construction Activities (Attach additional sheet if necessary for additional contractors).

B. CONTRACTOR'S CERTIFICATION STATEMENT

I certify under penalty of law that I understand the terms and conditions of the State's General Permit (NVR100000) that authorizes storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Company 1		
Name:		Phone:
Address:		
City:	State:	Zip:
Print Name:		Title:
Signature:		Date:
Company 2		
Name:		Phone:
Address:		
City:	State:	Zip:
Print Name:		Title:
Signature:		Date:
Company 3		
Name:		Phone:
Address:		
City:	State:	Zip:
Print Name:		Title:
Signature:		Date:

VIII. Records of Inspection and Construction Activities

A. Record of Major Construction Activities and BMP Implementation [§ III.A.5.b]

Provide the dates of when major grading activities occur, the dates when construction activities on a portion of a site temporarily or permanently cease, and list the dates when temporary and permanent stabilization practices are implemented. Photo documentation of major construction activities and implementation of BMPs is strongly recommended.

Construction Start: 09/01/2011

Project Completion: 8/30/2012

B. Record of Construction Site Inspections [§ III.A.12.e-f]

Provide a record of inspection reports to include the name and qualifications of person making the inspections, the dates of inspection, and major observations relating to the implementation of the SWPPP. Major observation should include the location(s) of discharges of sediment or other pollutants from the site, location(s) of BMPs that need to be maintained, location(s) of BMPs that failed or proved to be inadequate, and location(s) where additional BMPs are needed. All issues of non-compliance shall be noted. If the site is in full compliance with this SWPPP and permit NVR100000 on the date of inspection, the report shall contain a certification of compliance. These records shall be retained as part of the SWPPP for at least three years from the date that permit coverage expires or the site is finally stabilized.

ROUTINE INSPECTIONS

Inspection reports shall identify any incidents of noncompliance with the permit. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the SWPPP and this permit. The report shall be signed in accordance with Part V.B.1 of the permit. Inspection forms will be retained in Appendix D of the SWPPP. SCE will retain inspection reports and record of follow-up actions as part of the SWPPP for at least 3 years in accordance with the Permit.

SAMPLING

SCE will conduct stormwater sampling, as necessary, to determine the nature and impact of unauthorized discharge, in an effort to minimize any adverse impacts to receiving waters (Permit Section V.A.).

- Test procedures for analyses of pollutants will conform to regulations (40 CFR § 136) published pursuant to Section 304(h) of the Act, under which such procedures may be required, unless other procedures are approved by NDEP;
- If measurement or samples are taken SCE will record the following information:
  a. The exact place, date, and time of sampling;
  b. The dates the analyses were performed;
  c. The person(s) who performed the analyses;
  d. The analytical techniques or methods used; and
  e. The results of all required analyses.
- If samples or measurements are taken, said samples will be representative of the volume and nature of the discharge. Laboratory analyses will be performed by a State of Nevada certified laboratory.

Results from this lab must be provided to NDEP.

(To be provided by SCE)

Laboratory Name: Calscience Environmental Laboratories, Inc.
Address: 7440 Lincoln Way, Garden Grove, CA
Phone: 714-895-5494

C. Record of Follow-up Actions

Based on the results of the inspections conducted above, provide a record of the follow-up maintenance and corrective actions conducted at the site. Implementation of follow-up actions should occur within seven (7) days following receipt of inspection results or prior to the next anticipated storm event.

SCE will retain records of follow-up actions in Appendix D.

If BMPs need to be modified or if additional BMPs are necessary, SCE will complete implementation within 7 days of the inspection observation or prior to the next anticipated storm event, whenever practicable. If it impractical to implement actions before the next storm event, then the BMPs will be implemented as soon as possible.

When an inspection calls for changes or additions to BMPs the SWPPP will be updated as appropriate to include the revised control measure's details. Revisions to the SWPPP will be completed within seven (7) calendar days following the inspection. SWPPP updates/amendments will be noted in Appendix E.

APPENDIX A – Notice of Intent and NV General Permit

Re: Stormwater General Permit NVR100000
Confirmation Number: CSW- 22519
Project Name: EITP Telecommunication Construction Activities
Date: 8/8/2011

Owner
Southern California Edison
Mr. John Slayton
8631 Rush Street

Rosemead, CA 91770-____

Operator
Southern California Edison
Mr. John Slayton
8631 Rush Street

Rosemead, CA 91770-

*** If this is a Renewal Application, NO filing fee is required.**

Submission of this Electronic Notice of Intent constitutes notice that the Permittee identified in this request intends to be authorized by a National Pollutant Discharge Elimination System (NPDES) permit issued for storm water discharges in the State of Nevada and has or will comply with the following:

1. The Permittee will comply with all applicable permit conditions,
2. The Permittee understands that implementation of the Storm Water Pollution Prevention Plan, which is required under by the General Permit will begin at the time the permittee commences work on the project identified in Section I of this application,
3. The Permittee understands that failure to submit the required $200.00 fee and this signed Section Certification within 30 days of the electronic submittal will result in failure for eligible coverage under the General Permit; and,
4. That Nevada Administrative Code (NAC) 445A.268 Section (5)(b) reads, in part, that a Permittee (discharger) who is covered under a general permit shall pay to the Director a nonrefundable fee of $200 not later than July 1 of each year that the discharger is covered under that permit.
5. To Terminate coverage of the Nevada NPDES General Permit for Stormwater Discharges, the Permittee must submit a Notice of Termination ("NOT") form when their facilities no longer have any stormwater discharges associated with Construction activity as defined in the Nevada's General Stormwater Permit or EPA regulations at 40 CFR 122.26, or when they are no longer the operator of the site.

For Construction sites, elimination of all stormwater discharges associated with construction activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the native cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geo-textiles) have been employed.

Please mail the filing fee of $200.00 along with this notice to:

Stormwater Coordinator 3173
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
901 South Stewart Street, Suite 4001
Carson City, NV 89701-5249

Should you have any questions, please call Bonnie Hartley at (775) 687-9430.

NOI Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. I also confirm that a storm water pollution prevention plan (SWPPP) has been completed, will be maintained at the project site from the start of construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines for knowing violations.

Owner or Operator Name (Please Print): Don Johnson, Manager 3, TDBU Major Projects Organization

Signature (Please use a Non-Black Ink Color): 9/12/11

ndep NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

Stormwater General Permit NVR100000

In compliance with the provisions of the Federal Clean Water Act as amended (33 U.S.C. 1251 et seq: the "Act") and Chapter 445A of the Nevada Revised Statutes (NRS), eligible dischargers who have submitted a Notice of Intent, filing fee, and have a Stormwater Pollution Prevention Plan(s) completed and maintained on the permittee's site location in accordance with this permit, are authorized to discharge

Stormwater Associated with Large Construction Activity

or

Stormwater Associated with Small Construction Activity

and

Stormwater Associated with Industrial Activity from Temporary Concrete, Asphalt, and Material Plants or Operations Dedicated to the Permitted Construction Project

to Waters of the United States in accordance with the conditions set forth in Parts I - V hereof.

This permit shall become effective on September 16, 2007.

This permit and the authorization to discharge shall expire at midnight September 15, 2012.

Signed this 14th day of September, 2007.

Steve McGoff, P.E.
Bureau of Water Pollution Control

PART I. COVERAGE UNDER THIS GENERAL PERMIT

A. **Permit Area.** This General Permit covers the State of Nevada, except for Tribal Areas.[1]

B. **Objective.** The objective of this permit is to control and reduce pollution of Waters of the U.S. ("WOUS") from: Stormwater Discharges Associated with Large Construction Activity; Stormwater Discharges Associated with Small Construction Activity; and Stormwater Discharges Associated with Industrial Activity from temporary plants or operations set up to produce concrete, asphalt, or other materials for the permitted construction project; through the use of Best Management Practices ("BMPs"), as defined in Appendix A. In addition, BMPs shall include erosion and sediment controls, stormwater conveyance, stormwater diversion, and treatment structures, and any procedure or facility used to minimize the exposure of pollutants to stormwater or to remove pollutants from stormwater. Discharges to storm drain systems that in turn discharge to WOUS are considered to be discharges to WOUS.

C. **Eligibility.** This General Permit authorizes discharges from stormwater discharge associated with large construction activity as defined in Appendix A, small construction activity as defined in Appendix A and industrial activities as defined in Appendix A provided the operator complies with all the requirements of this general permit and submits a Notice of Intent ("NOI") in accordance with Part II of this general permit.

Any discharges that do not comply with the eligibility conditions of this permit are not authorized by the permit. A person must either apply for a separate National Pollutant Discharge Elimination System ("NPDES") permit to cover the ineligible discharge(s), cease the discharge(s), or take the necessary steps to make the discharge(s) eligible for coverage under this permit.

D. Authorized Discharges

1. Allowable Stormwater Discharges. Subject to compliance with the terms and conditions of this permit, an operator may discharge pollutants in:
    a. Discharges of stormwater runoff associated with construction activities as defined in Appendix A;
    b. Discharges that are designated by NDEP as requiring a stormwater permit under 40 CFR 122.26(a)(1)(v); 40 CFR 122.26(b)(15)(ii); or under 40 CFR 122.26(a)(9);

1 The State of Nevada, Division of Environmental Protection, Bureau of Water Pollution Control does not have permit authority for Tribal Lands. Construction discharge permits for Tribal Lands within the state must be acquired through EPA Region IX.

c. Discharges from support activities(e.g. concrete or asphalt batch plants, equipment staging yards, material storage yards, excavated material disposal areas, borrow areas) provided:
   i. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of stormwater associated with construction activity;
   ii. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators and does not operate beyond the completion of the construction activity at the last construction project it supports; and
   iii. Appropriate controls and measures covering the discharges from the support activity areas are identified in a stormwater pollution prevention plan ("SWPPP").
d. Non-stormwater discharges as noted in Part I.D.2 or as otherwise specifically allowed by the permit; and
e. Discharges comprised of a discharge listed in Part I (a) through (d) commingled with a discharge authorized by a different NDPES permit and/or discharge that does not require NPDES permit authorization.

2. Miscellaneous Non-Stormwater Discharges. An operator may discharge the following non-stormwater discharges, provided they are not a significant source of pollutants and the operator implements appropriate BMPs to minimize pollutants discharged per Part III:

a. Discharges from fire-fighting activities. Although fire-fighting drainage may contain significant pollutant concentrations, the frequency of discharge is low and the discharge and is hereby authorized out of necessity;
b. Fire hydrant flushing;
c. Water used to wash vehicles where detergents are not used;
d. Water used to control dust, provided effluent or other wastewaters are not used;
e. Potable water sources including water line flushing;
f. Routine external building wash down where detergents are not used;
g. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
h. Uncontaminated air conditioning or compressor condensate;
i. Uncontaminated groundwater or spring water;
j. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
k. Potable water well flushing where the receiving waters are ephemeral;
l. Water used for compacting soil, provided effluent or other wastewaters are not used;

m. Water used for drilling and coring such as for evaluation of foundation materials, where flows are not contaminated with additives; and
n. Water obtained from dewatering operations of foundations in preparation for and during excavation and construction that will have flows of 300 gallons per minute ("gpm") or less for thirty (30) days or less.

E. Limitations of Coverage

1. Post Construction Discharges. This permit does not authorize stormwater discharges that originate from the site after construction activities have been completed and the site, including any temporary support activity site, has undergone final stabilization. Post-construction stormwater discharges from industrial sites may need to be covered by a separate NPDES permit.
2. Prohibition on Discharges Mixed With Non-Stormwater. This permit does not authorize discharges that are mixed with sources of non-stormwater, except as allowed in Part I.D.
3. Discharges Covered by Another NPDES Permit. This general permit does not authorize stormwater discharges associated with construction activities that have been covered under an individual permit or have been required to obtain coverage under an alternative general permit. Construction discharges at mining operations are covered under the Mining General Permit NVR300000.
4. Discharges Threatening Water Quality. This general permit does not authorize discharges that will cause or contribute to non-attainment of water quality standards or to the designated use of receiving waters. The operator must design and implement BMPs sufficient to meet this requirement.

F. Waiver for Small Construction Activities. NDEP may exempt a small construction operator from the requirement to obtain coverage under a stormwater permit, if certain criteria are met and proper application procedures followed.

1. Low Erosion Potential. If the small construction site is between 1 acre and 5 acres and the rainfall erosivity factor calculation ("R" in the Revised Universal Soil Loss Equation) is less than 5 during the **entire** period of construction activity, the site will be eligible for a waiver. The applicant must certify to NDEP that construction activity will occur only when R is less than 5. The erosivity factor can be calculated using NDEP's NOI database.

   The period of construction activity begins at initial earth disturbance and ends with the final site stabilization. The operator must submit a Permit Waiver electronically to NDEP in accordance with Part II of this permit before commencing construction activities in accordance with Part II.

   Persons that are not required to file for permit coverage per this section must operate exempt construction sites in a manner that minimizes pollutants in the discharge. In the event discharges from the site may cause or contribute to non-

attainment of water quality standards, NDEP may require the operator to obtain permit coverage.

Note: Construction activities that will disturb 5 acres or more cannot be exempted from stormwater permitting requirements. Also, construction activities less than 5 acres, but the parcel is part of a greater (5 acres or more) common plan of development or sale cannot be exempted.

G. **Requirement for Individual Permit.** NDEP may require the holder of a general stormwater permit to apply for and obtain an individual permit in accordance with NAC 445A.269.

H. **Requirement for Stormwater Permit for Projects Less Than 1 Acre.** If NDEP determines that a project less than one (1) acre in size will impact receiving waters or its tributaries within a 1/4-mile radius of the project, the owner of the project will be required to obtain a stormwater permit and abide by the terms of this permit.

I. **Waiver for Certain Oil and Gas Operations.** NDEP may not require a permit for discharges of storm water runoff from construction operations at oil and gas exploration, production, processing or treatment operations or transmission facilities, composed entirely of flows which are from conveyances or systems of conveyances (including but not limited to pipes, conduits, ditches, and channels) used for collecting and conveying precipitation runoff and which are not contaminated by contact with or that has not come into contact with, any overburden, raw material, intermediate products, finished product, byproduct or waste products located on the site of such operations. A permit will be required if a stormwater discharge from a construction operation at an oil and/or gas exploration, production, processing, treatment, or transmission facility contributes to a violation of a water quality standard (except for discharges of sediment.)

PART II. REQUEST FOR INCLUSION UNDER THIS GENERAL PERMIT

A. **Application for Coverage.** A person may be authorized to discharge under this general permit only if the stormwater discharge is associated with construction activities with the project site. An application seeking inclusion under this permit shall:

1. Submit a Notice of Intent ("NOI") no later than two (2) days prior to the start of construction. Eligible concrete, asphalt, and material plants or operations shall be included on the NOI submitted for the construction project. The site is covered provisionally under this permit once the NOI has been received electronically by NDEP and until approval of the permit by NDEP.
2. For each new NOI, the permittee must develop and implement a SWPPP that meets the requirements of Part III of this permit and covers either the entire site or

all portions of the site for which the permittee is an operator. The SWPPP shall be prepared and maintained on the permittee's project site for these discharges.

B. NOI Electronic Filing Requirements. NOI forms must be completed on-line at NDEP's website at the following address: ***http://ndep.nv.gov/bwpc/storm_cont03.htm***. The applicant will be required to provide the following information to complete the NOI and submit it to NDEP:

1. Owner/operator (applicant) information including the name, address, city, state, zip code and phone number of both the owner and operator;
2. Project/site information including the project name, project address/location, city, state, zip code, latitude, longitude, at least one Assessor's Parcel Number ("APN") associated with the project and the county;
3. Name of the receiving water for any stormwater discharge;
4. The estimated construction start date;
5. The estimated completion date of construction;
6. An estimate of the area to be disturbed to the nearest acre;
7. An estimate of the likelihood of a stormwater discharge;
8. The address of the location where the SWPPP can be viewed including the city, state, zip code and phone number. *Note: It is not necessary to submit a copy of the SWPPP to NDEP.*

C. Submitting the Completed NOI. After completing the NOI and filing it electronically with NDEP, the applicant must perform the following steps within thirty (30) days to complete the NOI application:

1. Print out a copy of the NDEP confirmation page and sign below the certification statement. The certification statement and the person responsible for signing the NOI is discussed in Part V of this permit;
2. Write a check to "NDEP" for the required permit fees; and
3. Mail the check and confirmation page with the original signature to:

   Stormwater Coordinator
   Bureau of Water Pollution Control
   Nevada Division of Environmental Protection
   901 S. Stewart Street, Suite 4001
   Carson City NV 89701

D. Continuation of Coverage in the General Permit. To continue to be included in this general permit, holders of expired general permit NVR100000 must submit a renewal NOI to NDEP within ninety (90) days of the effective date of this permit to remain included under the original NOI. The permittee must verify that the information on the renewal NOI is valid and accurate before submitting the renewal NOI for continued inclusion. No additional filing fee is required to file this renewal NOI. In addition, the previously supplied permit identification number (CSW-xxxx) must be included with the submittal.

E. Authorization Date of the Permit. The authorization date of the new permit shall be:

1. The date the NOI is approved by NDEP; or
2. The effective date of this permit for all holders of expired general permit NVR100000 that have submitted a renewal NOI for this permit;
3. An approval letter will be sent to the applicant stating the authorization date. Special conditions may be included in the permit.
4. During the period beginning on the authorization date and lasting until permit coverage is terminated, the permittee is authorized to discharge stormwater or approved non-stormwater to WOUS, as discussed in Part I.D. and in accordance with the SWPPP and the conditions listed in this permit.

PART III. STORM WATER POLLUTION PREVENTION PLAN

A. Objective. Prior to submitting the NOI and filing fee, the SWPPP shall be completed and available for inspection at the project site for each construction project and material plant or operation covered by this permit. The purpose of the SWPPP is to identify stormwater pollution sources, reduce their impacts, and comply with the conditions of this permit. The SWPPP shall be prepared in accordance with good engineering practices and shall consist of project information, BMPs, inspection and maintenance, controls for non-stormwater discharges, and a description of permanent stormwater controls that will be built as part of the project. Each of the plan elements must be revised as necessary to maintain accuracy if there are changes in design or construction of the project or if the SWPPP is found to be insufficient. NDEP may require modifications to a SWPPP within a specified time frame. The permittee shall make the SWPPPs available upon request to the State or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site. The SWPPP must be kept on-site or locally available and must be available for review by NDEP at the time of an on-site inspection. The SWPPP shall include the following minimum elements:

1. Project Description

a. Permittee information including the company or agency, street address, city, state, zip code, and phone number;
b. Contact information of the permittee including the name, street address, city, state, zip code, and phone number;
c. The name(s) of the person(s) responsible for implementation of the SWPPP;
d. The project name;
e. The project location including the address, city, county and at least one APN associated with the project;

f. A description of the nature of the construction activity;
g. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation);
h. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other construction activities including offsite borrow and fill areas;
i. An estimate of the runoff coefficient of the site for both the preconstruction and post-construction conditions and data describing the soil or the quality of any discharge from the site;
j. A general location map of the project (e.g., a portion of a city or county map) and a site map of the project indicating the following:

i. Drainage patterns and approximate slopes anticipated after major grading;
ii. Construction activities and areas of soil disturbance;
iii. Areas of the project that will not be disturbed;
iv. Locations of major structural and nonstructural controls identified in the SWPPP;
v. Locations where stabilization practices are expected to occur;
vi. Locations of off-site material and waste;
vii. Borrow or equipment storage areas;
viii. Location of all surface waters (including wetlands);
ix. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply;
x. Locations where storm water discharges to a surface water (including ephemeral waters or dry washes) and to Municipal Separate Storm Sewer Systems ("MS4s");
xi. Location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt plants and dedicated concrete plants, which is covered by this permit;
xii. The name of the receiving water(s) and the aerial extent and description of wetland or other special aquatic sites at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project;
xiii. Identify and address offsite material storage areas or borrow areas used solely by the permittee's project;
xiv. A copy of the permit requirements (attaching a copy of this permit is acceptable).

2. **Stormwater Controls.** Each SWPPP shall include a description of appropriate control measures (i.e., BMPs) that will be implemented as part of the construction activity to control pollutants in storm water discharges. The SWPPP must clearly describe for each major activity identified in Part III.1.g: (a) Appropriate control

measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which permittee is responsible for implementation.

3. **Offsite Material Storage Areas.** Offsite material storage areas (also including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the permitted project are considered a part of the project and must be addressed in the SWPPP.

4. **Erosion and Sediment Controls.** The SWPPP must describe the implementation of control measures, including the following minimum components:

   a. **Design.** The construction-phase erosion and sediment controls should be designed to retain sediment on site to the degree attainable.

   b. **Selection, Installation and Maintenance.** All control measures must be properly selected, installed, and maintained in accordance with the manufacturers' specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for site situations, as soon as practicable and before the next storm event. If implementation prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable.

   c. **Offsite Accumulation of Sediment.** When sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to ensure no adverse effects on water quality (e.g., fugitive sediment in street could be washed into storm drains by the next rain and/or pose a safety hazard to users of public streets).

   d. **Good Housekeeping.** The SWPPP must describe good housekeeping procedures to prevent litter, construction debris, and construction chemicals exposed to stormwater from becoming a pollutant source for storm water discharges (e.g., screening outfalls, picked up daily).

5. **Stabilization Practices.**

   a. **Description and Schedule.** The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include but are not limited to: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod

stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures.

b. **Records of Stabilization.** The following records shall be maintained and attached to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

c. **Deadlines for Stabilization.** Except as provided in Part III.A.5.c.(i), (ii), and (iii) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased.

i. Where the initiation of stabilization measures by the fourteenth (14^{th}) day after construction activity temporary or permanently cease(s) is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.

ii. Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures do not have to be initiated on that portion of site.

iii. In arid areas (areas with an average annual precipitation of 0 to 10 inches), semiarid areas (areas with an average annual precipitation of 10 to 20 inches), and areas experiencing droughts where the initiation of stabilization measures by the fourteenth (14^{th}) day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

6. **Structural Practices.** The SWPPP must include a description of structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Structural practices may include but are not limited to: silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Placement of structural practices in floodplains should be avoided to the degree attainable. The installation of these devices may be subject to section 404 of the Clean Water Act ("CWA"). A combination of sediment and erosion control measures is required to achieve maximum pollutant removal.

a. **Sediment Basins.**

i. For common drainage locations that serve an area with ten (10) or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from a 2-year, 24-hour storm event from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location it is not necessary to include flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. In determining whether installing a sediment basin is attainable, the permittee may consider factors such as site soils, slope, available area on site, etc. In any event, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design.

ii. For drainage locations that serve ten (10) or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions.

iii. For drainage locations serving less than ten (10) acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume of runoff from a 2-year, 24-hour storm event or 3,600 cubic feet of storage per acre drained is provided.

b. **Velocity Dissipation Devices.**

Velocity dissipation devices must be placed at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. no significant changes in the hydrological regime of the receiving water).

7. **Post-Construction Stormwater Management.** The SWPPP must include a description of stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges that will occur after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable. Such measures must be designed and installed consistent with applicable local or state stormwater management requirements.

   Such practices may include but are not limited to: stormwater detention structures (including wet ponds); stormwater retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWPPP shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.

   Note: The installation of these devices may also require a separate permit under section 404 of the CWA. Permittees are only responsible for the installation and maintenance of stormwater management measures prior to final stabilization of the site, and are not responsible for maintenance after stormwater discharges associated with construction activity have been eliminated from the site. However, post construction stormwater BMPs that discharge pollutants from point sources once construction is completed may, in themselves, need authorization under a separate NPDES permit.

8. **Non-Storm Water Discharge Maintenance.** The SWPPP must identify all allowable sources of non-stormwater discharges listed in Part I.D.2 of this permit, except for flows from fire fighting activities. Non-stormwater discharges are to be eliminated or reduced to extent possible. The operator must implement appropriate pollution prevention measures to minimize pollutants in any non-storm water component(s) of the discharge and must describe those measures in the SWPPP. Except if used in emergency firefighting, superchlorinated wastewaters must be held on-site until the chlorine dissipates, or otherwise dechlorinated prior to discharge.

9. **Other Controls.** The SWPPP must describe:

   a. Measures to prevent the discharge of solid materials, including building

materials, to WOUS, except as authorized by a permit issued under section 404 of the CWA;

b. Measures to minimize off-site vehicle tracking of sediments, to the extent practicable, and the generation of on-site dust;

c. Measures to sufficiently stabilize soil at culvert locations to prevent the formation of rills and gullies during construction;

d. A description of construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP shall also include a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response; and

e. A description of pollutant sources from areas other than construction (including stormwater discharges from dedicated asphalt plants and dedicated concrete plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.

10. Applicable Federal, State, or Local Programs.

a. The SWPPP shall be consistent with applicable State, and/or local waste disposal, sanitary sewer or septic system regulations to the extent these are located within the permitted area;

b. When discharges to water quality-impaired waters that are contained in the current 303(d) Impaired Water Body listing issued by the Nevada Division of Environmental Protection, Bureau of Water Quality Planning, the permittee must investigate whether discharges from the permittee's site will contribute significantly to any 303(d) listing, and when the permittee discharges into a water body with an established Total Maximum Daily Load ("TMDL"), the permittee shall comply with all applicable TMDL requirements. This information can be found on the following NDEP website: http://ndep.nv.gov/bwqp/standard.htm.

When a TMDL has not been established as described in paragraph above, the permittee must include a section in the SWPPP describing the condition for which the water has been listed. The SWPPP must also include a demonstration that the BMPs that are selected for implementation will be sufficient to ensure that the discharges will not cause or contribute to an exceedance of an applicable State water quality standard;

c. Permittees that discharge storm water associated with construction

activities must ensure their SWPPP is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or stormwater management site plans or site permits approved by State or local officials;

d. SWPPPs must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment and erosion site plans or site permits, or stormwater management site plans or site permits approved by State or local officials for which the permittee receives written notice; and

e. The SWPP may incorporate by reference the appropriate elements of plans required by other agencies. A copy of the requirements incorporated by reference shall be included as an attachment to the SWPPP.

11. Maintenance of BMPs

a. All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections required by Part III.A.12 identify BMPs that are not operating effectively or if the capacity has been reduced by 50%, maintenance shall be performed before the next anticipated storm event, or as soon as possible if maintenance before the next anticipated storm event is not practicable;

b. If existing BMPs need to be modified or additional BMPs are necessary, implementation must be completed before the next anticipated storm event. If implementation prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable; and

c. The permittee must remove sediment from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.

12. Construction Site Inspections

a. **Routine Inspection Schedule.** The permittee must ensure routine inspections are performed at the site to ensure the BMPs are functional and that the SWPPP is being properly implemented. The permittee must have the site inspected at least once every seven (7) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater;

b. **Inspection Waiver.** Permittees are eligible for a waiver of weekly inspection requirements until one month before thawing conditions are expected to result in a discharge if all of the following requirements are

met:

i. The project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month);
ii. Land disturbance activities have been suspended; and
iii. The beginning and ending dates of the waiver period are documented in the SWPPP.

c. **Inspectors.** Qualified personnel (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site. "Qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls and who possesses the skills to assess conditions at the site that could impact stormwater quality and the effectiveness of the BMPs selected to control the quality of the stormwater discharges;

d. **Scope of Inspections.** Inspections must include all areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation. Inspectors must look for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether sediment and erosion control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking. All BMPs and areas inspected and their condition must be documented in the inspection report;

e. **Inspection Report.** An inspection report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWPPP shall be made. Major observations should include the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection;

f. **Maintaining Inspection Records.** The permittee must ensure that the inspection reports and record of any follow-up actions taken in accordance with Part III.A.12.e of this permit is retained as part of the SWPPP for at least three years from the date that permit coverage expires or the site is finally stabilized. Inspection reports shall identify any incidents of noncompliance with this permit. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the SWPPP and this permit. The report shall be signed in accordance with Part V.B.1 of this permit;

g. **Follow-Up Actions.** Based on the results of the inspection, the SWPPP shall be modified as necessary (e.g., show additional controls on a map required by Part III.A.1.j and/or revise the description of controls required by Part III.A.2) to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven (7) calendar days following the inspection. If existing BMPs need to be modified or if additional BMPs are necessary, implementation shall be completed within 7 days following receipt of the inspection results or prior to the next anticipated storm event, whenever practicable. If implementation of the BMPs before the next storm event is impracticable, the BMPs shall be implemented as soon as possible if implementation before the next anticipated storm event is not practicable.

13. **Maintaining an Updated SWPPP.** The operator must amend the SWPPP within seven (7) business days whenever:

a. There is a change in design, construction, operation, or maintenance at the construction site that has a significant effect on the discharge of pollutants to WOUS that has not been previously addressed in the SWPPP; or

b. During inspections, monitoring if required, or investigations by the permittee or by local, state, MS4, or federal officials, it is determined the discharges are causing or contributing to water quality exceedances or the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the construction site.; or

c. If implementation of the BMPs required by the SWPPP revision before the next storm event is impracticable, the BMPs shall be implemented as soon as possible if implementation of the BMP before the next anticipated storm event is not practicable.

14. **Deficiencies in the SWPPP.** NDEP may notify the permittee at any time that the SWPPP does not meet one or more requirements of this section. The notification must identify the provisions of this permit that are not being met and parts of the

SWPPP that require modification. Within fifteen (15) days of receipt of the notification by NDEP, the permittee must make the required changes to the SWPPP and submit to NDEP a written certification that the requested changes have been made. NDEP may request a copy of the SWPPP to confirm that all deficiencies have been adequately addressed. NDEP may also take appropriate enforcement action for the period of time the permittee was operating under a plan that did not meet the minimum requirements of this permit.

PART IV. NOTICE OF TERMINATION

A. **Notice of Termination.** A Notice of Termination ("NOT") must be submitted upon completion of the project. To terminate permit coverage, an NOT, as approved by NDEP, shall be submitted when final stabilization has been achieved or when the project has been transferred to another permittee.

B. **Information Required.** The following minimum information is required on an NOT:

1. The stormwater general permit number;
2. Facility operator information, including the name, address, city, state, zip code and phone number;
3. Facility/site location information including the name, address, city, state, zip code, phone number and at least one APN associated with the project; and
4. A certification statement signed and dated by the permittee. The certification statement is:

> "I certify under penalty of law that all storm water discharges associated with construction activity from the identified facility that was authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act."
>
> *Note: For construction projects with more than one permittee and/or operator, the permittee need only make this certification for those portions of the construction site where the permittee was authorized under this permit and not for areas where the permittee was not an operator.*

C. **Final Stabilization.** Final Stabilization means that either:

1. All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures have been employed. In such parts of the country, background native vegetation will cover less than 100% of the ground. Establishing at least 70% of the natural cover of the native vegetation meets the vegetative cover criteria for final stabilization (e.g., if the native vegetation covers 50% of the ground, 70% of 50% would require 35% total cover for final stabilization; on a beach with no natural vegetation, no stabilization is required); or

   For individual lots in residential construction by either:

   a. The homebuilder completing final stabilization as specified above, or
   b. The homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization; or

2. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to WOUS, and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria listed above.

PART V. STANDARD PERMIT CONDITIONS

A. Operating Requirements

1. **Proper Operation and Maintenance.** The permittee shall implement all BMPs used to comply with this permit and maintain them in good working order;

2. **Removed Substances.** Solids and other pollutants removed in the course of treatment or control of stormwater shall be disposed of in accordance with applicable laws, regulations, codes, and ordinances;

3. **Water Quality Standards.** There shall be no discharge of substances that cause or contribute to a violation of the water quality standards of the State of Nevada;

4. **Sampling and Analysis.** If any samples or measurements are taken pursuant to this permit they shall be representative of the volume and nature of the discharge. Laboratory analyses shall be performed by a State of Nevada certified laboratory. Results from this lab must be provided to NDEP.

5. **Test Procedures.** Test procedures for analyses of pollutants shall conform to regulations (40 CFR § 136) published pursuant to Section 304(h) of the Act, under which such procedures may be required, unless other procedures are approved by NDEP;

6. **Recording the Results.** If any measurement or sample is taken pursuant to this permit, the permittee shall record the following information:

   a. The exact place, date, and time of sampling;
   b. The dates the analyses were performed;
   c. The person(s) who performed the analyses;
   d. The analytical techniques or methods used; and
   e. The results of all required analyses.

7. **Adverse Impact.** The permittee shall take all reasonable steps to minimize any adverse impacts to receiving waters from any unauthorized discharge including monitoring as necessary to determine the nature and impact of the unauthorized discharge.

B. Administrative Requirements

1. **Signature Requirements**

   a. **Notices of Intent**
   All NOIs shall be signed as follows:

      i. **For a corporation.** By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

         (1) A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or
         (2) The manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other

comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

ii. **For a partnership or sole proprietorship.** By a general partner or the proprietor, respectively; or

iii. **For a municipality, state, federal, or other public agency.** By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(1) The chief executive officer of the agency, or
(2) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. **Duly Authorized Representative.** All SWPPPs and any other information required by this permit or requested by NDEP shall be signed by a person described in Part V.B.1, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

i. The authorization is made in writing by a person described in Part V.B.1;
ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
iii. The written authorization is submitted to NDEP.

c. **Changes to Authorization.** If an authorization in Part V.B.1 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new written authorization satisfying the requirements of Part V.B.1.b must be submitted to NDEP prior to or together with any information signed by the new representative.

d. **Certification.** Any person signing a document in Part V.B shall make the following certification.

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. I also confirm that a stormwater pollution prevention plan (SWPPP) has been completed, will be maintained at the project site from the start of construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines for knowing violations."

2. **Records Retention.** All records and information resulting from activities performed pursuant to this permit shall be retained for a minimum of three years; or longer if required by NDEP.

3. **Availability of Reports.** Except for data determined to be confidential under NRS 445A.665, all reports prepared in accordance with the terms of this permit shall be available for public inspection at NDEP's office. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445A.710.

4. **Continuation of Coverage.** In accordance with NAC 445A.241, this permit shall remain in effect until reissued, and existing permittees shall be included in the reissued permit if a new NOI is submitted prior to the expiration date of this permit. A filing fee is not required for this new submittal.

5. **Transfer of Ownership or Control.** If control or ownership of the construction project changes, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to NDEP. To transfer permit coverage, the new owner or controller must submit a written request to NDEP. All transfer of permits shall be approved by NDEP.

6. **Annual Fee.** The permittee shall remit an annual fee in accordance with NAC 445A.268 on or before July 1 every year. If the original submittal for this permit is done prior to July 1, the permittee shall resubmit a new annual fee on or before July 1 of that same year.

7. **Right of Entry.** The permittee shall allow NDEP's representatives upon the presentation of credentials:

    a. To enter upon the construction site or the permittee's premises where any records are kept under the terms and conditions of this permit; and
    b. At reasonable times, to have access to and copy any records kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method used pursuant to this permit; and to perform any necessary sampling to determine compliance with this permit or to sample any discharge.

8. **Penalty for Violation of Permit Conditions.** The permittee shall comply with all conditions of this permit. Any permit non-compliance constitutes a violation of the CWA and is grounds for enforcement action, permit termination, revocation and re-issuance, or modification, or denial of a permit renewal application. NRS 445A.675 provides that any person who violates a permit condition is subject to administrative and judicial sanctions as outlined in NRS 445A.690 through 445A.705.

9. **Furnishing False Information and Tampering with Monitoring Devices.** Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained by the provisions of NRS 445A.300 to 445A.730, inclusive, or by any permit, rule, regulation or order issued pursuant thereto, or who falsifies, tampers with or knowingly renders inaccurate any monitoring device or method required to be maintained under the provisions of NRS 445A.300 to 445A.730, inclusive, or by any permit, rule, regulation or order issued pursuant thereto, is guilty of a gross misdemeanor and shall be punished by a fine of not more than $10,000 or by imprisonment. This penalty is in addition to any other penalties, civil or criminal, provided pursuant to NRS 445A.300 to 445A.730, inclusive.

10. **Permit Modification, Suspension or Revocation.** After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

    a. Violation of any terms or conditions of this permit;
    b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
    c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

11. **Liability.** Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or

penalties established pursuant to any applicable Federal, State or local laws, regulations, or ordinances.

12. **Property Rights.** The issuance of this permit does not convey any property rights, in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

13. **Severability.** The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Appendix A – Definitions

Best management practices (``BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of ``Waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Construction Activities - Construction activities include any clearing, grading and excavation activities that result in the disturbance of one (1) acre or more of total land area, or will disturb less than one (1) acre but are part of a larger common plan for development or sale that will ultimately disturb one (1) or more acres..

CWA - Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483 and Public Law 97-117, 33 U.S.C. 1251 et seq. CWA and regulations means the Clean Water Act (CWA) and applicable regulations promulgated thereunder. In the case of an approved State program, it includes State program requirements.

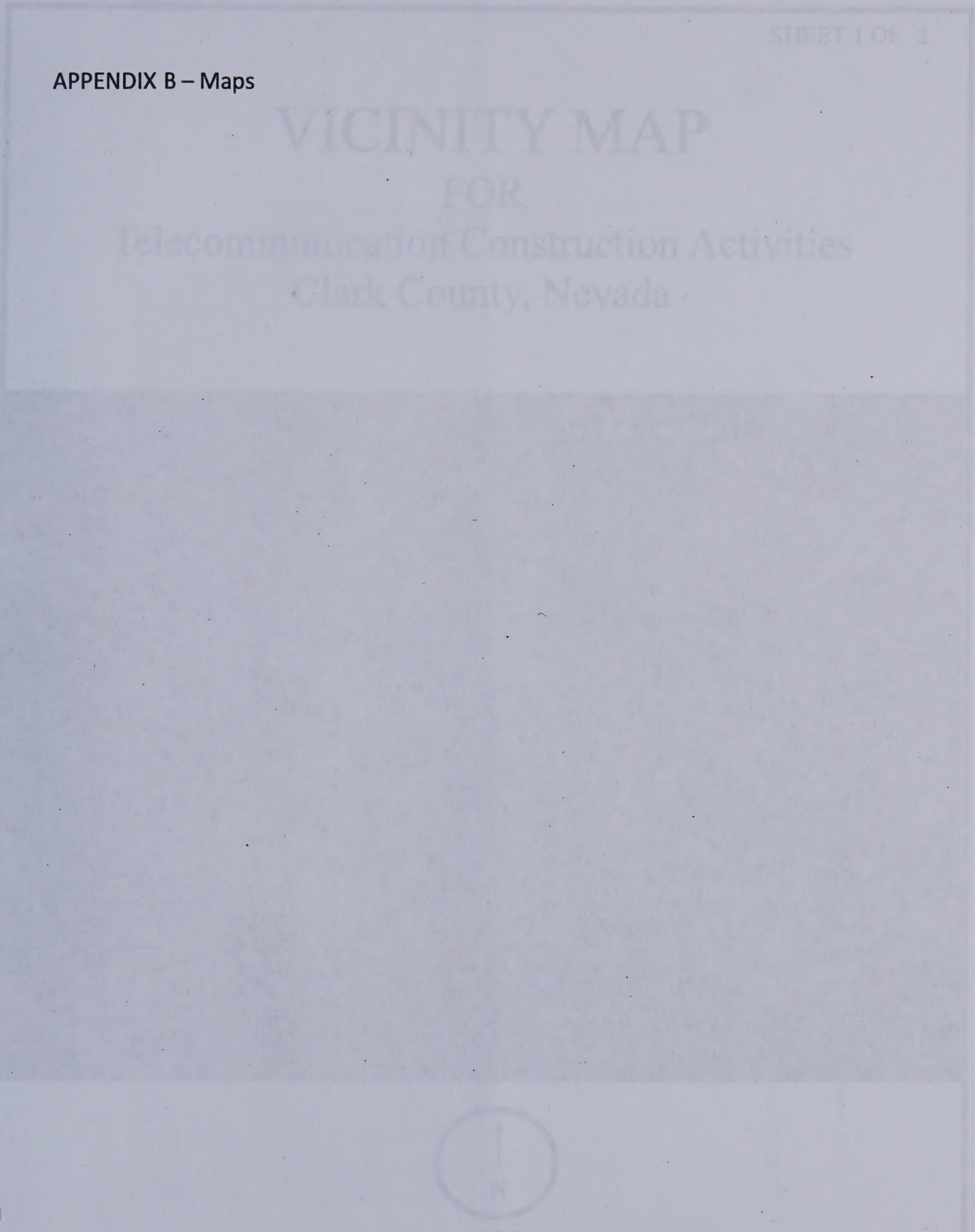
Industrial Activities means temporary concrete, asphalt and material plants which are dedicated to the permitted construction activity.

Large construction activity includes clearing, grading and excavation that results in the disturbance of five acres or more of total land area.

Small construction activity includes the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one and less than five acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility. NDEP may waive the otherwise applicable requirements in a general permit for a storm water discharge from construction activities that disturb less than five acres where the value of the rainfall erosivity factor (``R" in the Revised Universal Soil Loss Equation) is less than five during the period of construction activity. The rainfall erosivity factor is determined in accordance with Chapter 2 of Agriculture Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), pages 21-64, dated January 1997.

Stormwater means storm water runoff, snow melt runoff, and surface runoff and drainage.

APPENDIX B – Maps



VICINITY MAP

FOR

Telecommunication Construction Activities
Clark County, Nevada

N

N.T.S.

SHEET 1 OF 3

VICINITY MAP

FOR

Telecommunication Construction Activities

Clark County, Nevada

N

NTS

SITE MAP
FOR
ELDORADO-IVANPAH TRANSMISSION PROJECT
TELECOMMUNICATION CONSTRUCTION ACTIVITIES
FROM ELDORADO SUBSTATION TO CA/NV BORDER AT NIPTON ROAD
CLARK COUNTY, NEVADA

WATER POLLUTION CONTROL NOTES

(1) INSTALL FIBER ROLL OR GRAVEL BAG LINEAR BARRIER PER CASQA BMP SE-5 OR SE-6, RESPECTIVELY.
NOTE: SEE SHEET 2 FOR PULLING AND SPOOLING SITE TYPICAL LINEAR BARRIER DETAIL.

LEGEND

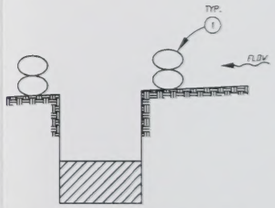
- LWM — LIQUID WASTE MANAGEMENT
- CW — CONCRETE WASHOUT
- SWM — SANITARY WASTE MANAGEMENT
- SP — STOCKPILE MANAGEMENT

NOTE: THIS PROJECT WILL UTILIZE DESIGNATED MATERIAL STORAGE YARDS. ANY NECESSARY ADDITIONAL AREAS/ACTIVITIES WILL BE FIELD LOCATED BY SCE AS CONSTRUCTION PROGRESSES.

- PULLING SITE
- WIRE SPOOLING SITE
- TOWER LOCATION
- TRENCHING ACTIVITIES

GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE CONTRACTOR AND SUBCONTRACTORS TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.
3. SECTION IV OF THE SWPPP DESCRIBES THE BEST MANAGEMENT PRACTICES TO BE USED ON THIS SITE.
4. IMPLEMENTATION OF THE VARIOUS WATER POLLUTION CONTROL MEASURES WILL CONFORM TO THE REQUIRED CONSTRUCTION STAGING REQUIREMENTS.



TYPICAL SECTION TRENCH PROTECTION DETAIL
NOT TO SCALE

N.T.S.

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: ELDORADO-IVANPAH TRANSMISSION PROJECT TELECOMMUNICATION CONSTRUCTION ACTIVITIES

STORM WATER POLLUTION PREVENTION PLAN SITE MAP

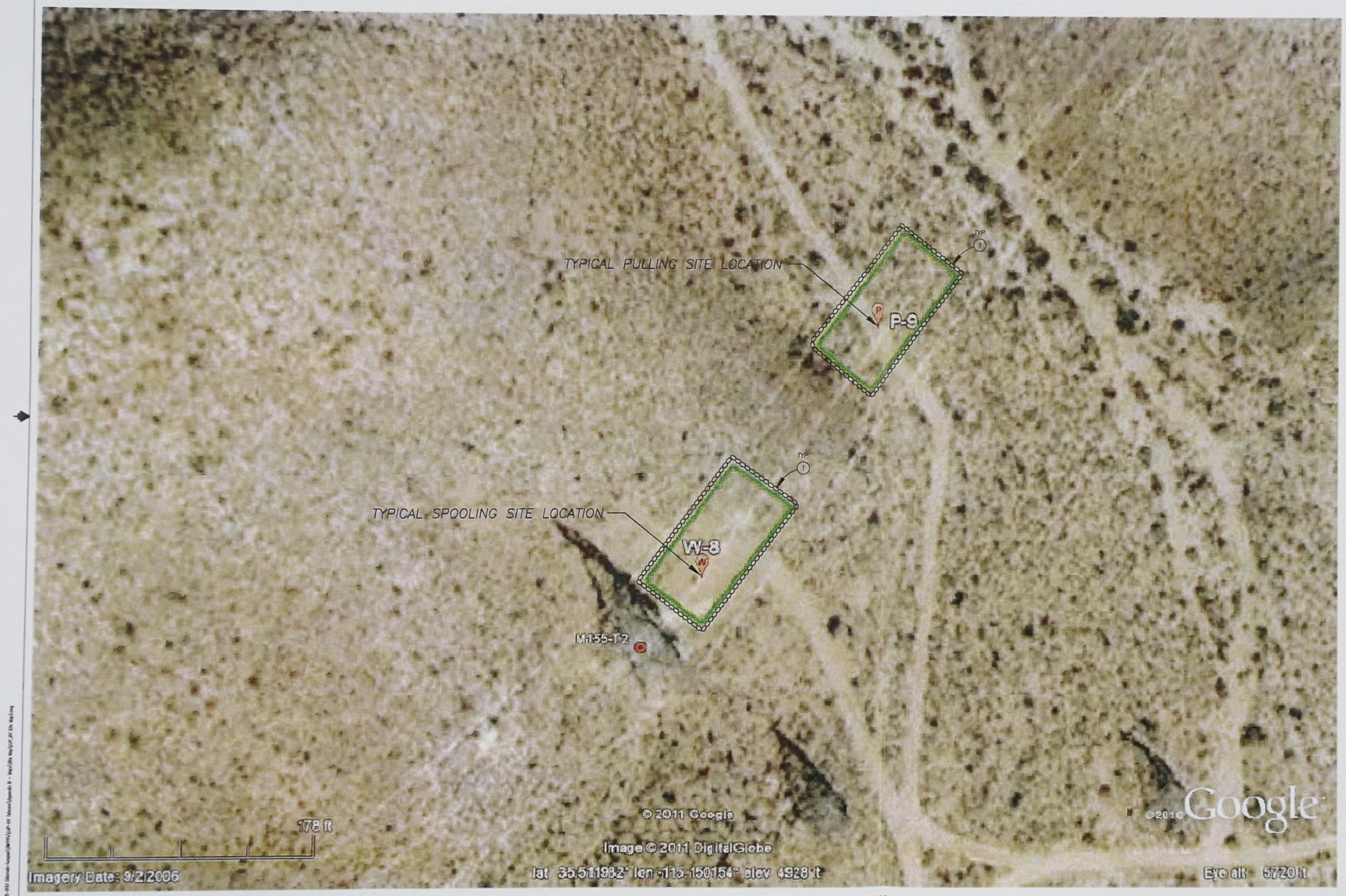
SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO. SITE MAP-01

SCALE: N.T.S.

1 OF 2 SHTS.

SITE MAP
FOR
ELDORADO-IVANPAH TRANSMISSION PROJECT
TELECOMMUNICATION CONSTRUCTION ACTIVITIES
FROM ELDORADO SUBSTATION TO CA/NV BORDER AT NIPTON ROAD
CLARK COUNTY, NEVADA



TYPICAL PULLING/SPOOLING SITE PROTECTION DETAIL
NOT TO SCALE

WATER POLLUTION CONTROL NOTES

1. INSTALL FIBER ROLL OR GRAVEL BAG LINEAR BARRIER PER CASQA BMP SE-5 OR SE-6, RESPECTIVELY.

LEGEND

- PULLING SITE
- WIRE SPOOLING SITE
- TOWER LOCATION
- LINEAR BARRIER

GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE CONTRACTOR AND SUBCONTRACTORS TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.
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4. IMPLEMENTATION OF THE VARIOUS WATER POLLUTION CONTROL MEASURES WILL CONFORM TO THE REQUIRED CONSTRUCTION STAGING REQUIREMENTS.

N.T.S.

* REVISE ON AUTOCAD SYSTEM ONLY *

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.	NO.	REVISIONS	DATE	SAP WO	SUPV	APPROVED	ENGR	CK'D	MADE	P.E.

LOCATION: ELDORADO-IVANPAH TRANSMISSION PROJECT TELECOMMUNICATION CONSTRUCTION ACTIVITIES

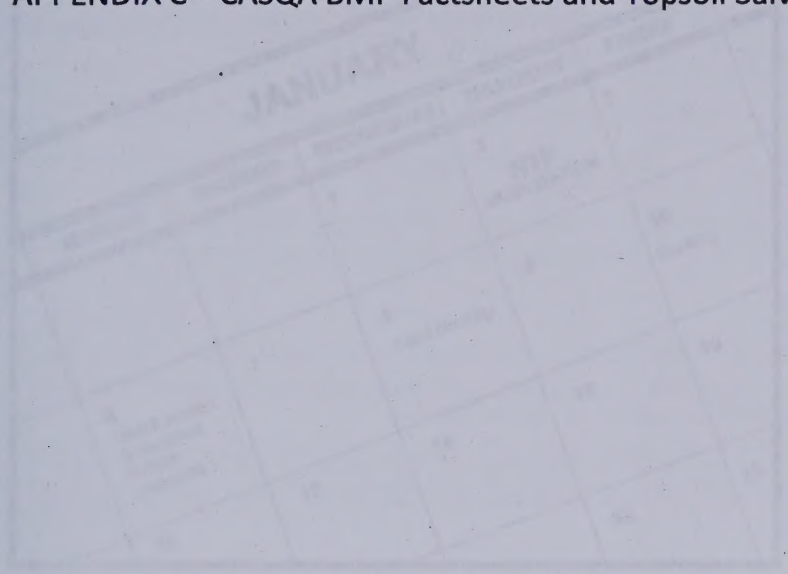
STORM WATER POLLUTION PREVENTION PLAN
SITE MAP

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

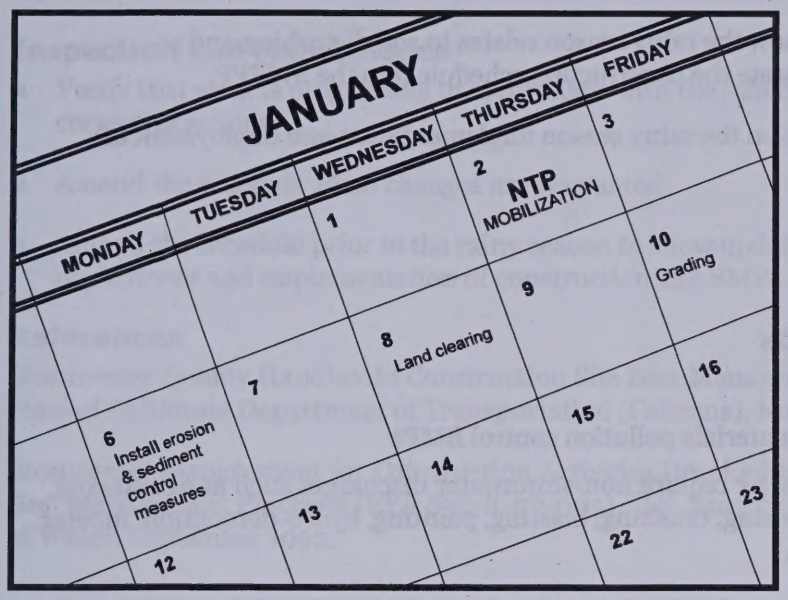
SHEET NO.
SITE MAP-02

SCALE: N.T.S.
2 OF 2 SHTS.

APPENDIX C – CASQA BMP Factsheets and Topsoil Salvage/Storage Guidance



Scheduling EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

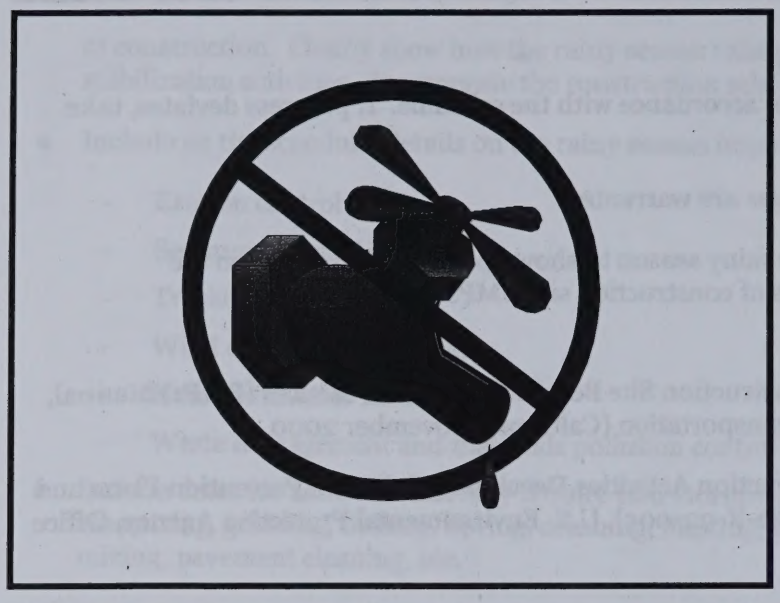
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

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into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

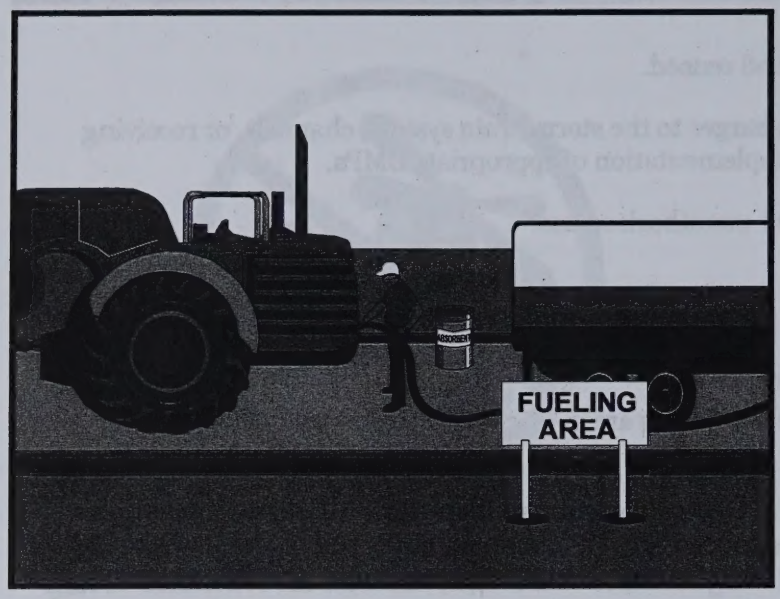
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Vehicle and Equipment Fueling NS-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

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be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

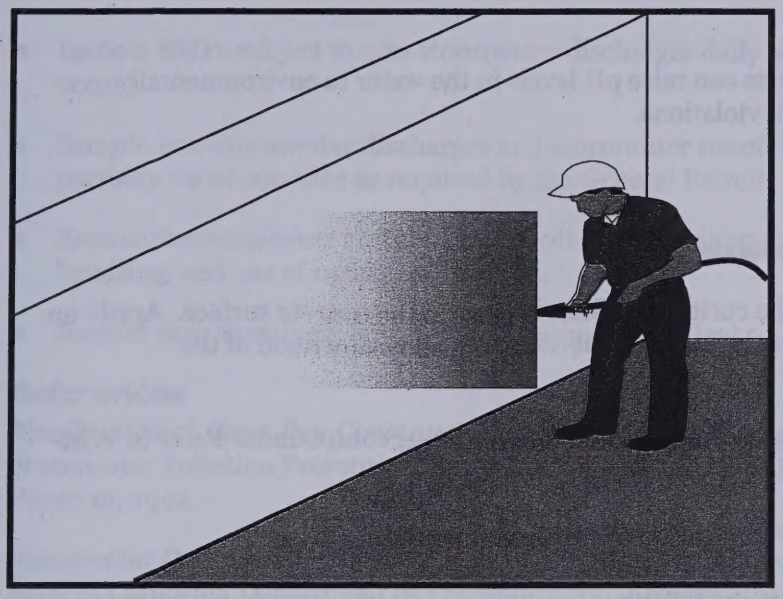
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Concrete Curing NS-12



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

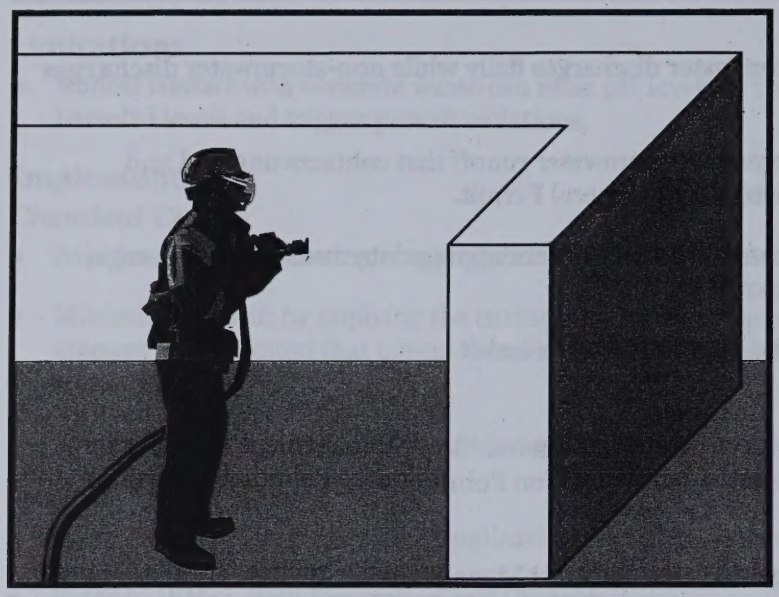
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

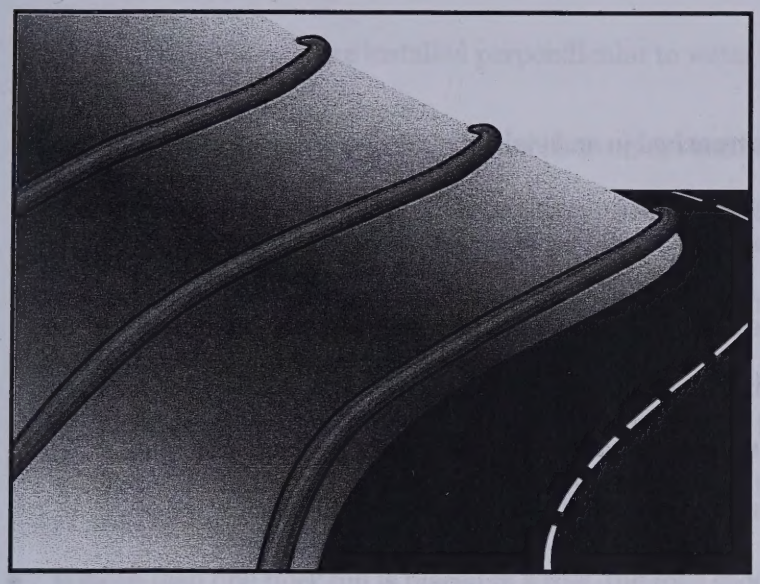
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

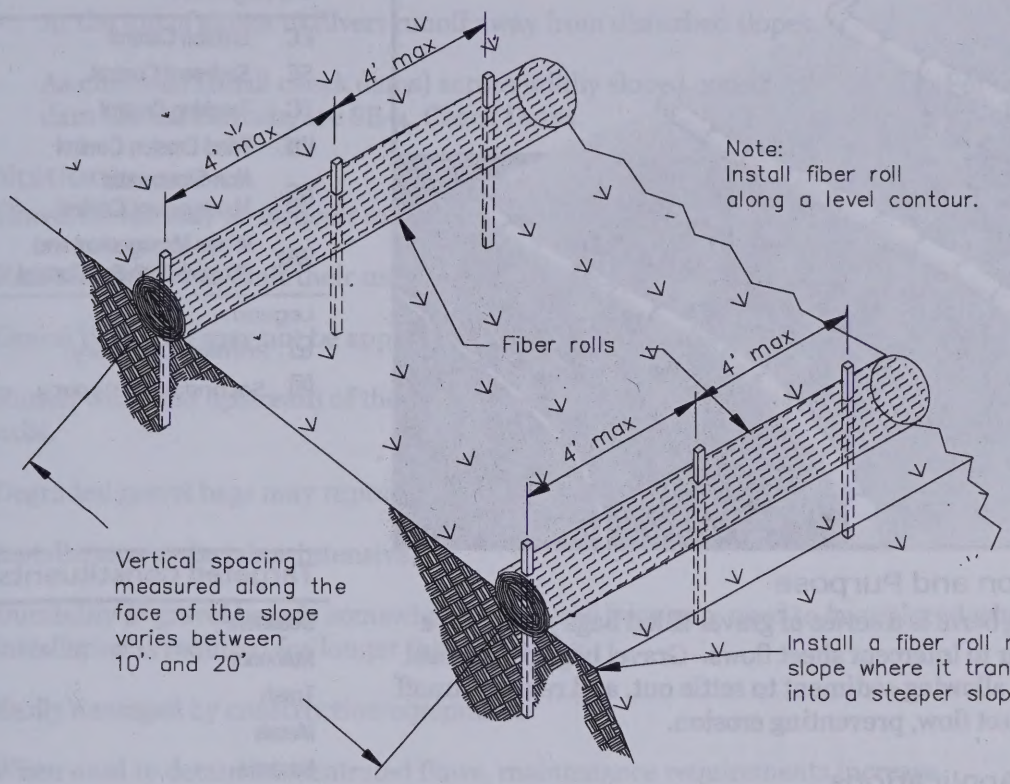
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

References

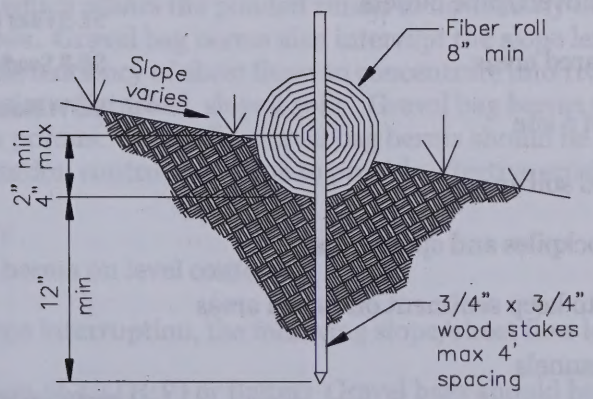
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION

N.T.S.

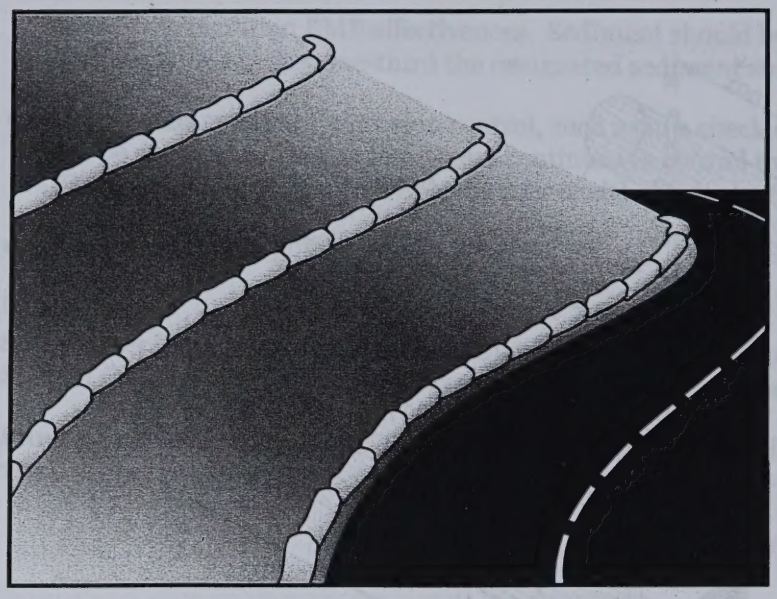


ENTRENCHMENT DETAIL

N.T.S.

Gravel Bag Berm

SE-6



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	

Legend:

☑ Primary Category

☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Roll

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- *Bag Material:* Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- *Bag Size:* Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.
- *Fill Material:* Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

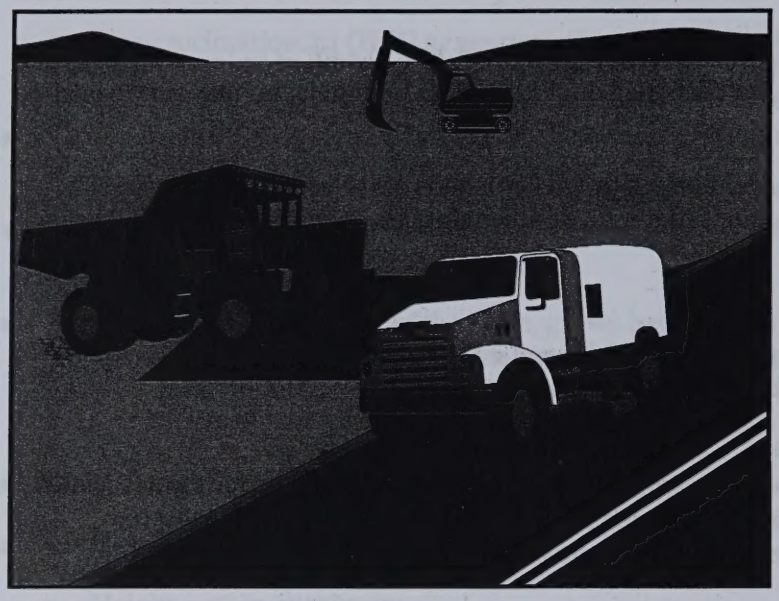
Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

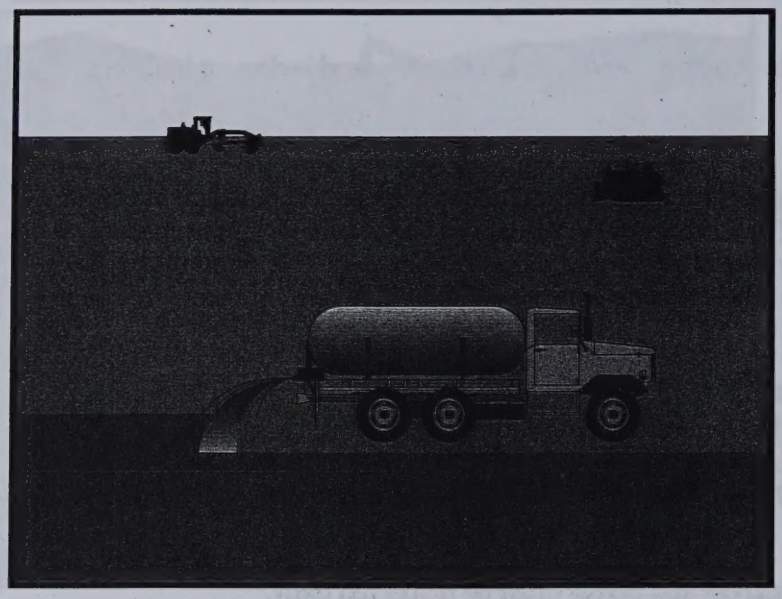
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

	x	x	x	x	x			x
			x	x	x	x		x
		x	x	x			x	x
			x			x	x	
			x	x				x
			x	x	x	x	x	
					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

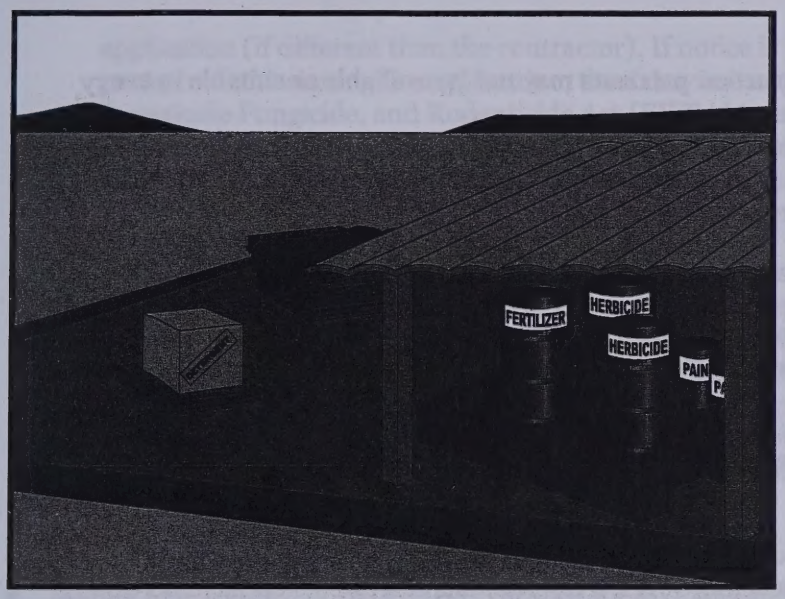
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

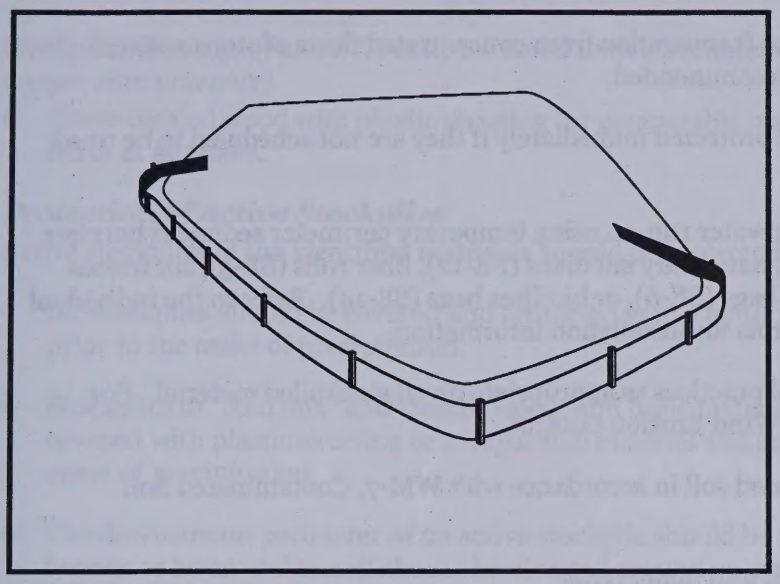
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Cover and project soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

Stockpiles of fly ash, stucco, hydrated lime

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

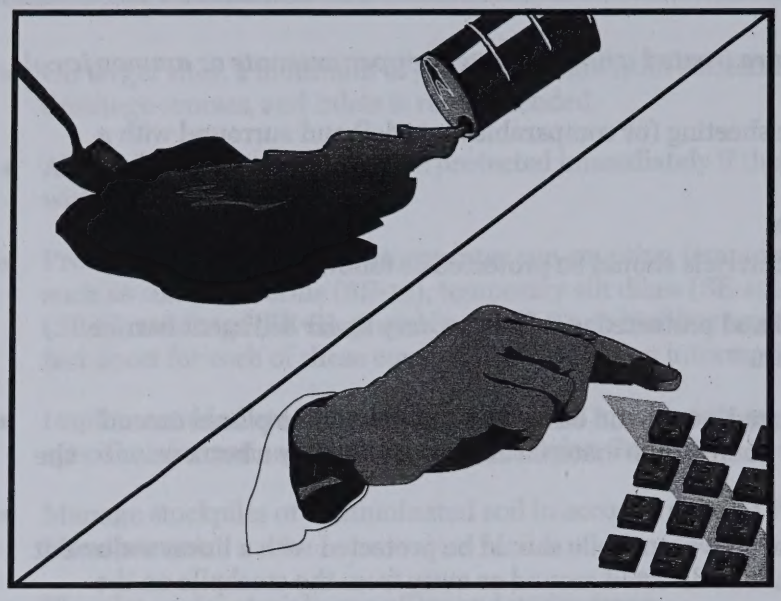
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Categories

EC	Erosion Control	
SE	Sediment Control	
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WE	Wind Erosion Control	
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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5

Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

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plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Contaminated Soil Management WM-7

Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

References

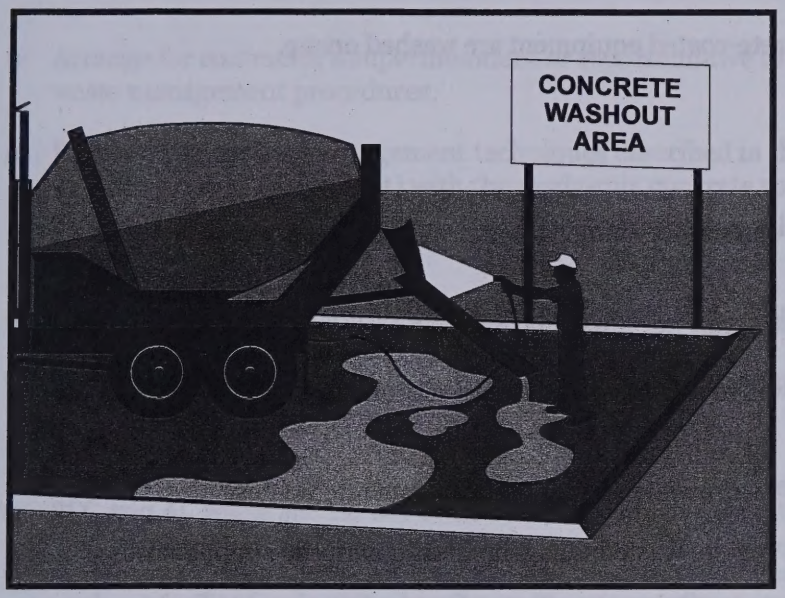
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

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- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washout should be lined so there is no discharge into the underlying soil.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a "roll-off"; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

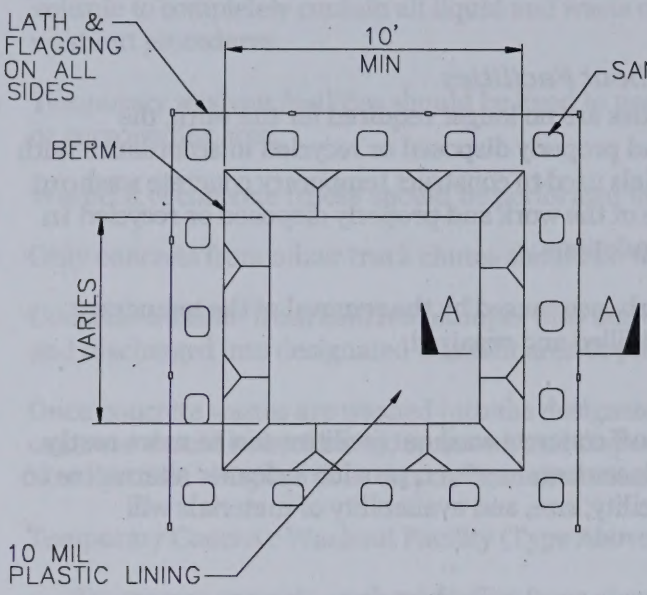
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.
- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

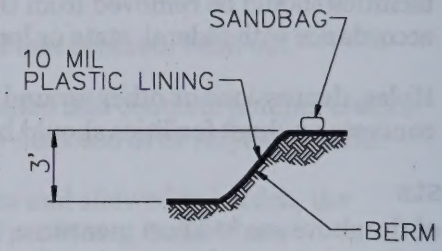
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

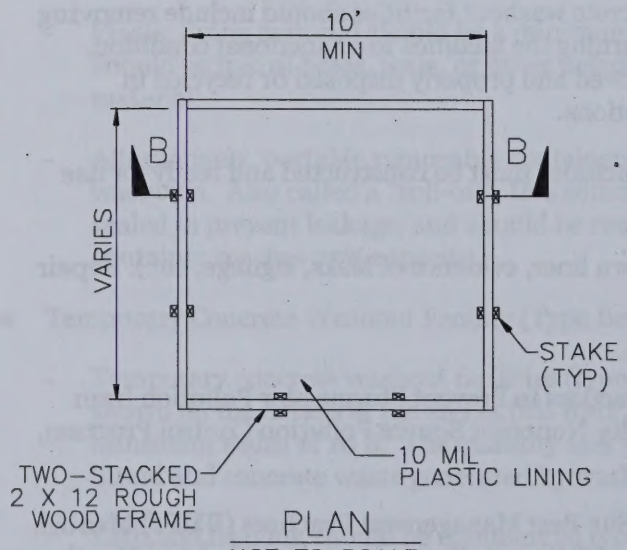
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



PLAN
NOT TO SCALE
TYPE "BELOW GRADE"



SECTION A–A
NOT TO SCALE



PLAN
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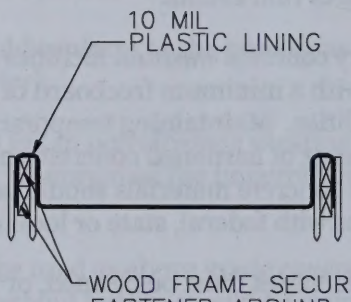
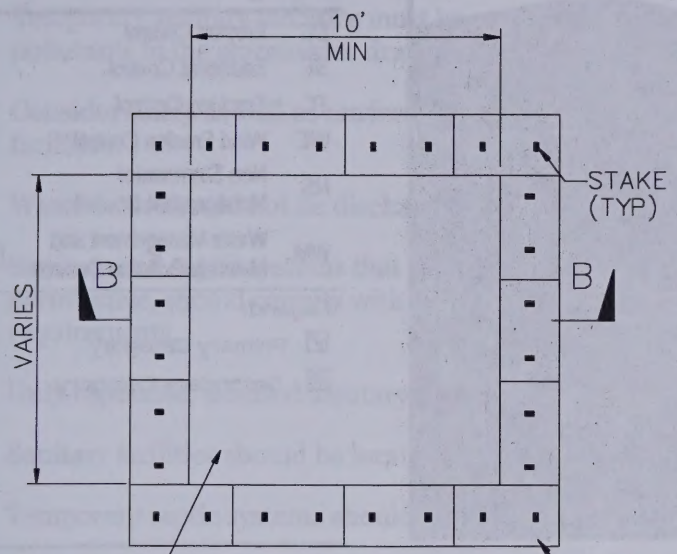
TYPE "ABOVE GRADE"



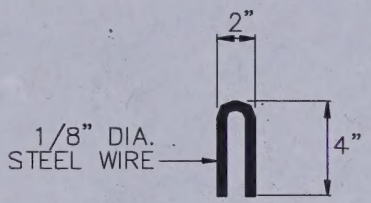
SECTION B–B
NOT TO SCALE

NOTES

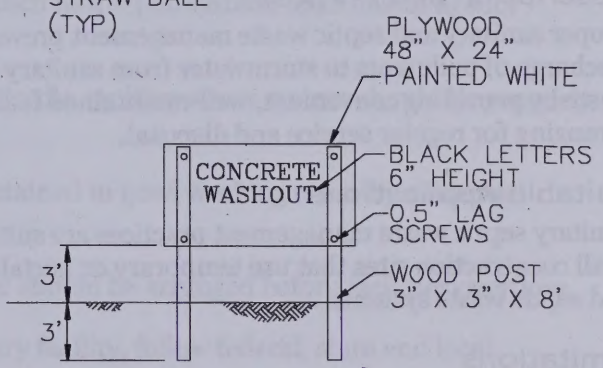
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



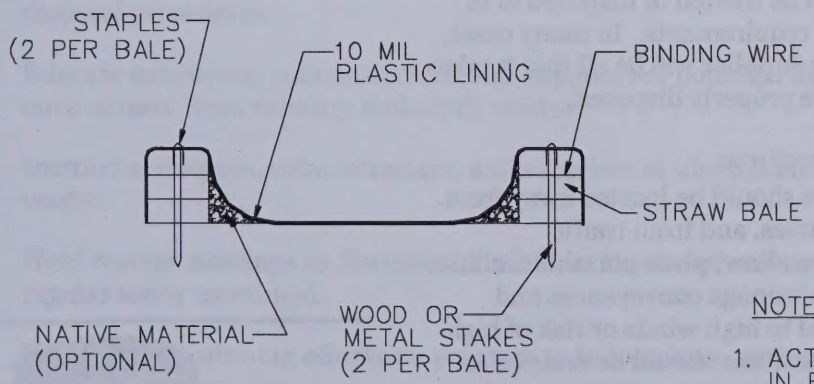
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

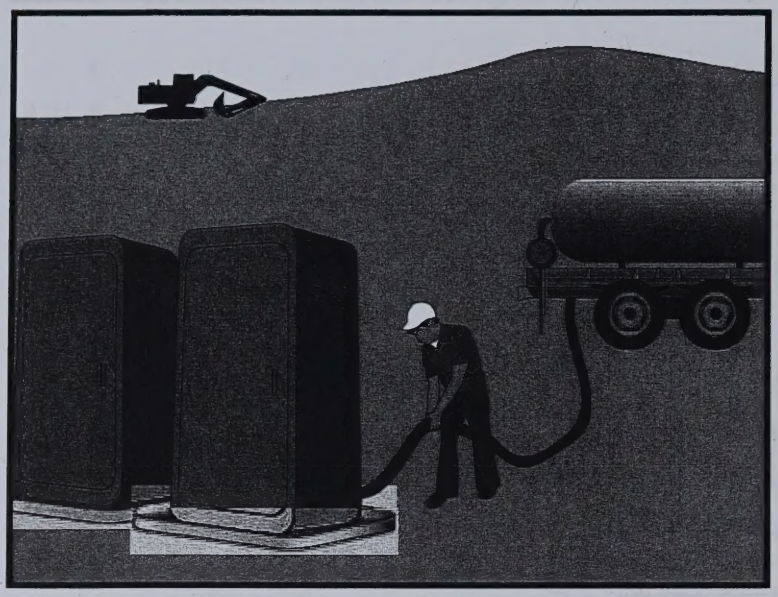


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ Primary Category
☒ Secondary Category

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

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CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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Topsoil Salvage, Storage, and Protection

- Prior to excavation or grading and as part of the "Clearing and Grubbing" effort in areas containing natural vegetation subject to temporary disturbance during project construction, the contractor shall salvage and set aside topsoil and duff (vegetative debris) in appropriate areas for subsequent redistribution after project construction is complete in each affected area.
- The contractor shall prepare for and conduct the following activities in coordination with a qualified biologist (e.g., the project biological monitor). The contractor shall notify the biologist prior to conducting these activities.

Identify Clearing and Grubbing Limits & Minimize Disturbance Area.

- The contractor shall not disturb natural areas beyond clearance limits. Also, it may not be necessary to clear and grub the entire area established for each specific project element (e.g., tower site, pulling/splicing area, etc.) to the maximum extent of available clearance limits in order to provide adequate room for construction activities and maneuvering. As required by project mitigation measures, it is recommended that the contractor minimize disturbance areas.
- Slope areas that are steeper than 3:1 may not be appropriate for topsoil salvage or redistribution and such operations are not required.
- The contractor shall coordinate with the biological monitor to identify the limits of clearing and grubbing and to identify areas where topsoil salvage may be impractical as well as where salvaged topsoil and duff will be placed, as described in the next bullet item.

Determine Topsoil Storage Sites.

- The contractor shall identify areas for storing topsoil. Salvaged material shall be stored in linear piles, not more than 4' in height. It is recommended that material be placed as close as possible to the area from which it was removed, generally along the edge of construction on either side of the project element area or project ROW. The objective is to facilitate subsequent re-spreading of material back over the disturbed area.

Salvage Topsoil and Duff.

- **Biological Monitor.** Prior to commencing activities, the contractor shall request the project biologist to be present to assist with salvage operations and to provide direction where discretion is indicated and to observe that work area limits are respected.
- **Remove Large Debris.** Prior to salvaging material, large boulders, tree stumps, logs, or large pieces of woody debris (e.g., > 3 - 4' long and > 3 - 4" diam.) and trash items or construction debris (e.g., tires, metal, barb wire, concrete, etc.) shall be picked out of the material to be collected. Non-woody trash shall be legally disposed of offsite. Natural woody items (i.e.,

stumps, logs, and large branches) may be moved to or piled in appropriate areas on site subject to biological monitor notification and approval.

- **NOTE** Do Not Remove Live Cactus, Yucca, or Trees Without Approval.** Cactus and yucca specimens and/or trees to be removed shall be clearly marked by the project biologist. Unless marked, trees should be considered "Protect in Place".
- **Track-walking.** Areas containing natural vegetation and topsoil to be collected within construction limits may be "track-walked" (by a bulldozer) to crush vegetation.
- **Collect salvageable material.** The contractor shall scrape at least the top 6" to 8" of topsoil and crushed vegetative debris from the surface area and place in designated storage area and/or at the edge of the construction area.
- **Avoid collecting weed seed.** Material should not be salvaged from areas dominated by weedy vegetation, as indicated by the biological monitor.

Mark/Protect Salvaged Material from Equipment Operations.

- At minimum, the contractor shall place colored flagging, silt fence, orange "snow fence", colored polyethylene rope, or other obvious marking material that clearly identifies areas containing salvaged material and indicates that "Construction Equipment and Vehicles are Prohibited from Operating" in or driving through these areas.
- The contractor shall replace or repair any flagging or other marking material designating salvaged material to be protected in place that is dislodged or damaged during the construction.
- If conflicts between construction access needs and topsoil storage placement arise during construction, the contractor may be required to move stored topsoil and duff material to more appropriate locations subject to prior notification and coordination with the biological monitor.

APPENDIX D – Inspections Records

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Temporary Erosion Controls				
Does the applied erosion control provide 100% coverage for the required areas?				
Are there any non-vegetated areas that need erosion control?				
Is the area where erosion control is required free from visible erosion?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, or mulching?				
Are there any areas of the site that are disturbed, but will likely lie dormant for over 14 days?				
Do any erosion control BMPs require maintenance?				
Temporary Sediment Controls				
Are temporary sediment controls functional, maintained properly, and installed in accordance with the details and/or the SWPPP Map?				
If not, do any sediment control BMPs require maintenance?				
Are temporary sediment controls free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced according to the SWPPP Map?				
Are fiber rolls installed and maintained on required slopes in accordance with the details, functional and maintained?				
Are silt fences placed on level contours?				
Storm Drain Inlet Protection				
Are storm drain inlet BMPs internal to the project installed and maintained properly, according to the storm drain inlet BMP Fact Sheet located in the SWPPP report?				
Similarly, are offsite storm drain inlet BMPs installed and maintained properly?				
Stockpiles				
Are stockpiles covered and protected from run-on, run-off from adjacent areas, and from winds?				
Are stockpiles covered and located at least 50 feet from concentrated flows, downstream drainage courses and storm drain inlets?				
Have soil stockpiles that will sit for over 14 days been stabilized?				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Tracking Control				
Does the project have a stabilized construction site entrance/exit and is it installed correctly according to the SWPPP?				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed according to the SWPPP?				
Wind Erosion Control				
Is dust control implemented?				

CONSTRUCTION SITE INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action/Location**
Is dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 50 feet away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 50 feet from concentrated flows and downstream drainage facilities?				
Are material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and water tight?				
Do temporary concrete washout facilities prevent concrete residues from entering the drainage system?				
Are the temporary concrete washout facilities' liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters with lids?				
Are trash receptacles provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				

CONSTRUCTION SITE INSPECTION CHECKLIST

Requirement	Yes	No	N/A	Corrective Action/Location
Are waste management receptacles free of leaks?				
Is the site free of litter?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Are portable toilets placed within containment to prevent the discharge (leaking) of pollutants?				
Spill Control and Response				
Are there proper spill clean-up materials, and posted spill-reporting procedures for hazardous materials and wastes in open and accessible locations adjacent to storage areas?				
If a spill has occurred, was the Environmental Specialist contacted within 24 hours of a spill of a hazardous substance?				
Non-Storm Water Discharges				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Environmental Specialist been notified?				
If there has been an unauthorized or non-storm water discharge, has it been immediately contained, cleaned up and documented in the SWPPP?				
Are there any other potential non-storm water pollution control concerns at the site?				
Discharge Points				
Are discharge points and discharge flows free from noticeable pollutants?				
Are discharge points free of any significant erosion and deposition?				
SWPPP Update				
Does the SWPPP adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown in the SWPPP Map also installed on the construction site?				
Is the SWPPP on-site where it is accessible to others?				
Is the NOI posted on-site?				
Does the SWPPP contain a current list of potential pollutant sources?				
General				
Are there any other potential water pollution control concerns at the site?				
Storm Water Monitoring				
If this is a post-storm inspection, did the storm event produce precipitation of 0.5 inch or more?				
Are there any noticeable odors or visible sheen on the surface of any runoff or discharges?				

STORM WATER MONITORING AND REPORTING

Parameter	Date	Time	Location	Result

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Visual Inspection Field Log Sheet for EITP Telecommunication Construction Activities

Date and Time of Inspection:			Report Date:	
Inspection Type:	□ Weekly	□ Following qualifying rain event	Project phase:	Approximate area of exposed site:

Observations of Unauthorized Non-stormwater Discharge

Where unauthorized discharged observed?	Identify location of discharge:
Observations (possible source of discharge):	

Odors	Yes □	No □
Floating material	Yes □	No □
Suspended Material	Yes □	No □
Sheen	Yes □	No □
Discolorations	Yes □	No □
Turbidity	Yes □	No □

Site Inspections

Outfalls or BMPs Evaluated	Deficiencies Noted
(see attached detailed **Construction Site Inspection Checklists**)	

Was water quality sampling part of this inspection?	❒ Yes	❒ No
If YES, see the results on the final page of the inspection form.		

Photos Taken:	Yes □	No □	Photo Reference IDs:

Corrective Actions identified to bring the site into compliance (note if SWPPP needs to be modified)

"I certify that this inspection form is true, accurate, and complete, to the best of my knowledge and belief."

Inspector Name:	Inspector Title:
Signature:	Date:

APPENDIX E – SWPPP Amendment Log

SWPPP AMENDMENT LOG

Project Name: Eldorado-Ivanpah Transmission Project, Telecommunication Construction Activities

Amendment No.	Prepared by	Brief Description of Amendment	Date

APPENDIX F – Responsible Parties

Responsible Parties

Title and Contact Information	Area of Responsibility
Entity Name: Southern California Edison Contact Person: TBD Address: 14005 South Benson Avenue City, State, Zip: Chino, CA 91710 Telephone Number: (310) 990-1745 Fax: (310) 833-0211	Property Owner and Permittee under the NV General Permit
Company Name: AEI-CASC Consulting Name: Alan Batdorf, CPESC Address: 18 Technology Drive City, State, Zip: Irvine, CA 92618 Telephone Number (including emergency contact number[s]): (949) 453-1783 Email: abatdorf@aei-casc.com	SWPPP Preparer
Company Name: Southern California Edison Contact Person: John Slayton, CPESC Address: 14005 South Benson Avenue City, State, Zip: Chino, CA, 91710 Telephone Number (including emergency contact number[s]): (310) 990-1745 Email: john.slayton@sce.com	SWPPP Manager - Implement the SWPPP on a daily basis at the Project, oversee the training of contractors and other personnel undertaking SWPPP-related duties, monitor and direct personnel with SWPPP responsibilities (including those installing or maintaining BMPs), perform inspections or delegate others to do so (see other delegated inspectors below).
Company Name: AEI-CASC Consulting Address: 18 Technology Drive City, State, Zip: Irvine, CA 92618 Phone: (949) 453-1783 Fax: (949) 453-1860 Name: Matt Renaud, CPESC Telephone Number (including emergency contact number[s]): (818) 263-3566 Email: mrenaud@aei-casc.com Alternate Name: Michael O'Hearn, CESSWI Telephone Number (including emergency contact number[s]): (714) 497-7276 Email: mohearn@aei-casc.com	SWPPP Inspector - Conduct inspections pursuant to NV Permit.
Contractor/Subcontractor Company Name: Address: City, State, Zip: Telephone Number (including emergency contact number[s]): Email:	Install, maintain, and replace erosion and sediment controls.

AMENDMENT NO. 2 TO

SOUTHERN CALIFORNIA EDISON COMPANY

DELEGATION OF SIGNATURE AUTHORITY

TRANSMISSION AND DISTRIBUTION

WHEREAS, effective November 25, 2009, James A. Kelly, Senior Vice President ("the Responsible Officer") and Stephen E. Pickett, Senior Vice President and General Counsel of Southern California Edison Company (the "Company") executed a Delegation of Authority and accompanying matrix (The "Matrix") most recently amended on May 3, 2010 (collectively, the "Delegation of Signature Authority"), designating certain employees of the Company the authority to execute and deliver on behalf of the Company certain contracts and other instruments specified in the Matrix, in each case subject to the monetary and other limitations specified in the Matrix.[1,2]

WHEREAS, the Responsible Officer deems it necessary to amend and entirely restate the Matrix as described on the attached Exhibit A.

NOW, THEREFORE, the Matrix shall be amended and entirely restated as described on the attached Exhibit A.

FURTHER, except as otherwise hereby amended, the Delegation of Authority Resolution shall remain in full force and effect. The Delegation of Signature Authority may be amended from time to time, in whole or in part, by a writing executed by the parties then holding the titles of the signatories below. The Delegation of Signature Authority, this Amendment and all further amendments to the Delegation of Signature Authority shall expire on December 31, 2010.

Date: 9/2/10

James A. Kelly
Senior Vice President

Approved:

Date: 9/3/10

Stephen E. Pickett
Senior Vice President and General Counsel
Attachment

1 Signature authority of SCE elected Vice Presidents is derived from the SCE Bylaws and not from this delegation. Consequently, any limitation on an officer's authority pursuant to this delegation is governed by internal company policy and would likely have no legal effect on outside parties.

2 To determine authority to sign documentation related to the settlement of any claim for or against SCE, or related to the prosecution or defense of any Small Claims Court litigation on SCE's behalf, see SCE Board Resolution "Authorization of Settlement of Claims," adopted on September 7, 2006.

SCE Transmission and Distribution
Signature Authorization Matrix and Supplementary Approval Guidelines
Pursuant to SCE Board Resolution "Delegations of Signature Authority"

Adopted on September 3, 2009[3]
As of August 23, 2010

EXHIBIT A

SAP PAYMENT AUTHORIZATIONS[4]

PROCUREMENT-PREQS & CHANGE ORDERS AUTHORIZATION LEVEL							
8	7	6	5	4	3	2	1
Unlimited	≤$2M	≤$1M	≤$500K	≤$250K	≤$100K	≤$25K	≤$5K
Bus Unit Sr. VP & VPs[5]	Director	MGR 2-3, MPP2-3, Construction Project Manager	SUP4, ENG5, TSP4, MGR1, ENG4, MPC3, MPP1	SUP3, TSP3, ENG3, MPC2	SUP1-2, APP2, TSP2	SES, Corporate Repr 3, CCM3, MPC1, PLA2, Planner-Power Systems 4	Admin. Support[6] Reporting to an M3 or Above

NON-PO PAYMENT AUTHORIZATIONS[7] AUTHORIZATION LEVEL							
8	7	6	5	4	3	2	1
Unlimited	≤$25M	≤$5M	≤$2M	≤$500K	≤$100K	≤$25K	≤$5K
Bus Unit Sr. VP & VPs[5]	Upon SCE Risk Management Committee Review & Approval	Upon SCE Risk Management Committee Review & Approval		Director	MGR3, Construction Project Manager	MGR2, MPP2	ENG4-5, MGR1, MPC2-3, MPP1, SUP2-4

3 To determine authority to sign documentation related to the settlement of any claim for or against SCE, or related to the prosecution or defense of any Small Claims Court litigation on SCE's behalf, see SCE Board Resolution "Authorization of Settlement of Claims," adopted on September 7, 2006.

4 Signature authority for SAP Purchase Requisitions (PREQ), Change Order, and Non Purchase Order (NPO) payment authorizations are approved in SAP via the Position Change Request Form (PCRF). An up-to-date list of authorized position numbers in SAP can be generated by running SAP transaction code ZHRAUDIT.

5 Signature authority of SCE elected Vice Presidents derives from SCE's by-laws and not from this delegation form.

6 In accordance with segregation of duty guidelines, PREQ maintainer and PREQ approver roles will not be granted to the employee concurrently.

7 Exceptions to the Non-PO payment authorization levels are named on Attachment 1.

CONTRACTS & OTHER INSTRUMENTS[8]

ADVANCED TECHNOLOGY				
Description	Bus Unit Sr. VP/ VP	Director	MGR3	MGR2
Confidentiality / Non-Disclosure Agreements	X	X		
Trial Use Agreements	X	X	X	
Agreements / Contracts to provide testing, research studies or engineering services to outside 3rd parties (e.g. DOE, CEC)	Unlimited	<$500K	<$100K	
EPRI Project/Program Agreements	Unlimited	<$500K	<$100K	<$25K
SCE Sponsored Hotel/Catering/Event Agreements/Contracts	Unlimited	<$500K	<$100K	<$25K

ENGINEERING & TECHNICAL SERVICES				
Description	Bus Unit Sr. VP/ VP	Director	MGR3	MGR2
Supplier Technical Qualification Letter				X
Applicant Financed and SCE Financed Added Facilities Agreements				X
Construction Project Storm Water Pollution Plan Permit Registration	X	X		X

[8] Signature authority for contracts and other instruments is delegated only to the specific employees named on Attachment 2.

APPENDIX G – Contractors and Subcontractors

CONTRACTORS AND SUBCONTRACTORS

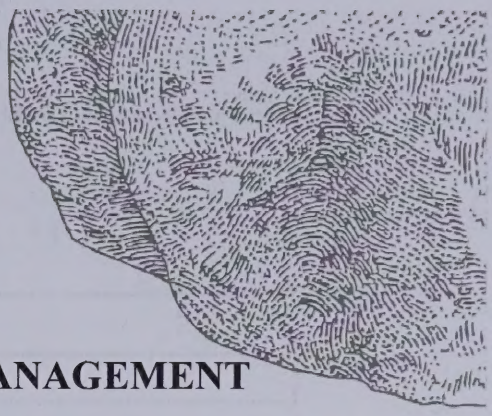
Contractor/Subcontractor Name and Address	Contact Person/ Phone Number	Activity	Start Date	Finish Date

Eldorado-Ivanpah Transmission Project

Paleontological Resource Management Plan

cogstone

PALEONTOLOGY - ARCHAEOLOGY - HISTORY



PALEONTOLOGICAL RESOURCES MANAGEMENT PLAN FOR THE ELDORADO - IVANPAH TRANSMISSION PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA AND CLARK COUNTY, NEVADA

Prepared for:
Southern California Edison
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BLM Permits CA-10-00-004P & N-88500

August 2010

Cogstone Project Number: 2023
Type of Study: Paleontological Resources Assessment and Management Plan
Localities: 5 records within 1 mile of the project area; 1 discovered within the alignment
Linear Miles: Transmission line route- Proposed 230kV (~35 mi), Alternative A (~5 mi), Alternative B (~5.2 mi), Alternative C (~5.3 mi), Alternative D (~3.3 mi), Alternative E (~1 mi); Telecom Routes- Path 1 (~35 mi), Path 2 Section 1 (~25.5 mi), Path 2 Section 2 (~4.8 mi), Path 2 Section 3 Alt 1 (~25 mi), Path 2 Section 3 Alt 2 (~20 mi)
Acres: BLM lands in CA 928; BLM lands in NV 1071; private 825
USGS 7.5' Quadrangles: Jean, Hidden Valley, Sloan SE, Boulder City SW, Roach, McCullough Pass, McCullough Mountain NE, Clark Mountain, Ivanpah Lake, Desert, McCullough Mountain, Highland Spring, Mescal Range, Mineral Hill, Nipton, Crescent Peak
Key Words: Quaternary playa, Quaternary alluvium, Quaternary older alluvium. Plio-Pleistocene gravels, Tertiary volcanics, Cambrian-Devonian(?) Goodsprings Dolomite, Precambrian metamorphics, pluvial lakes

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EXECUTIVE SUMMARY

Southern California Edison (SCE) proposed to build the Eldorado-Ivanpah Transmission Line Project from Mountain Pass, CA to the Eldorado Substation, NV (near Boulder City). An associated telecommunication line will run from Eldorado Substation across a more southerly route to Mountain Pass. The Bureau of Land Management (BLM) is the lead agency for the project. The project environmental impact report required implementation of Applicant Proposed Measures PALEO 1-8.

The SCE project consists of (1) removal of portions of an existing 115-kV transmission line, (2) construction of a new 230-kV transmission line and facilities along the proposed route as well as placement of a new fiber-optic line, (3) ground disturbance associated with ancillary project activities including but not limited to grading for access roads, microwave towers, pulling and splicing locations, marshalling and staging yards, and tower erection sites. The project right of way (ROW) is 130 feet through most of the alignment, but expands to 250 feet or more for substations and staging locations. Most footing shafts for the towers are to be drilled after some preliminary clearing of the area. The towers will have footings from 3 to 6 feet in diameter with a depth of 20 to 45 feet deep.

Applicant Proposed Measure PALEO 2 required a preconstruction field survey. Field survey was performed August 2-6 and 8-12, 2010. Utilizing a pre-existing record search, background information and the field survey, the project was assessed utilizing the BLM potential fossil yield system. Most of the project was determined to be in sediments with low or very low potential to yield fossils. The exceptions are areas in and near remnants of Pleistocene lakes. Generally, Pleistocene pluvial lakes yield numerous middle to late Pleistocene fossils. However, the pluvial lakes in the project area have not been investigated to the same degree as similar, but larger, lakes to the northwest. Full-time monitoring is required only in and near the pluvial lake beds. Spot checking of other sediments during the project for specific features is also required.

Applicant Proposed Measure PALEO 1 required preparation of a paleontological resources management plan to guide and facilitate the identification and treatment of paleontological resources located during the project in an effort to reduce adverse effects on significant resources. The paleontological resources management plan summarizes identified environmentally (paleontologically) sensitive areas along the project alignment, the organization and responsibilities of the monitors, communication procedures and the treatment (recovery, preparation, identification, analysis and curation) procedures to be implemented if paleontological resources are encountered during the project. Implementation of the plan will meet the requirements of Applicant Proposed Measures PALEO 3-8.

INTRODUCTION

PURPOSE OF STUDY

Cogstone Resource Management Inc. is the qualified paleontological firm retained by Southern California Edison (SCE), to provide paleontological services for the Eldorado to Ivanpah Transmission Line Project. Development and implementation of a Paleontological Resources Management Plan (PRMP) is required by Applicant Proposed Measures PALEO 1-8 of the Environmental Impact Report for the Eldorado-Ivanpah Transmission Line Project (SCE 2010). The Project Study Area is located within eastern San Bernardino County, California and Clark County Nevada (Figure 1).

PROJECT DESCRIPTION

The Southern California Edison project consists of (1) removal of portions of an existing 115-kV transmission line, (2) construction of a new 230-kV transmission line and facilities along the proposed route as well as placement of a new fiber-optic line, (3) ground disturbance associated with ancillary project activities including but not limited to grading for access roads, microwave towers, pulling and splicing locations, marshalling and staging yards, and tower erection sites. The project right of way (ROW) is 130 feet through most of the alignment, but expands to 250 feet or more for substations and staging locations. Most footing shafts for the towers are to be drilled after some preliminary clearing of the area. The towers will have footings from 3 to 6 feet in diameter with a depth of 20 to 45 feet deep.

The proposed route and alternate routes extend over sixteen USGS 7.5' topographic quadrangles including portions of the Jean, Hidden Valley, Sloan SE, Boulder City SW, Roach, McCullough Pass, McCullough Mountain NE, Clark Mountain, Ivanpah Lake, Desert, McCullough Mountain, Highland Spring, Mescal Range, Mineral Hill, Nipton, and Crescent Peak (Figure 2). Multiple Townships, Ranges and sections are included in the proposed project area (Table 1). The project footprint impacts 928 acres of BLM lands in California, 1071 acres of BLM lands in Nevada and 825 acres of private land.

TRANSMISSION LINES

The proposed 230-kV transmission line route spans from the Eldorado Substation southwest to the Ivanpah Substation, crossing the Sloan SE, Hidden Valley, McCullough Pass, Roach, Desert, and Ivanpah Lake USGS 7.5' topographic quadrangles (Figure 1, 2). The entire segment is approximately 35 miles long and would replace a portion of the existing 115-kV line running from the Eldorado Substation to Mountain Pass.

Parallel to LADWP Line Segment (Transmission Alternative Route A) of the proposed 230-kV transmission line route crosses a portion of the Sloan SE USGS 7.5' topo and is approximately 5 miles long. North of Eldorado (Transmission Alternative Route B) cuts north from the Eldorado Substation over the Sloan SE and the Boulder City SW USGS 7.5' topos and is approximately 5.2 miles long. North Dry Lakes Reroute (Transmission Alternative Route C) covers a portion

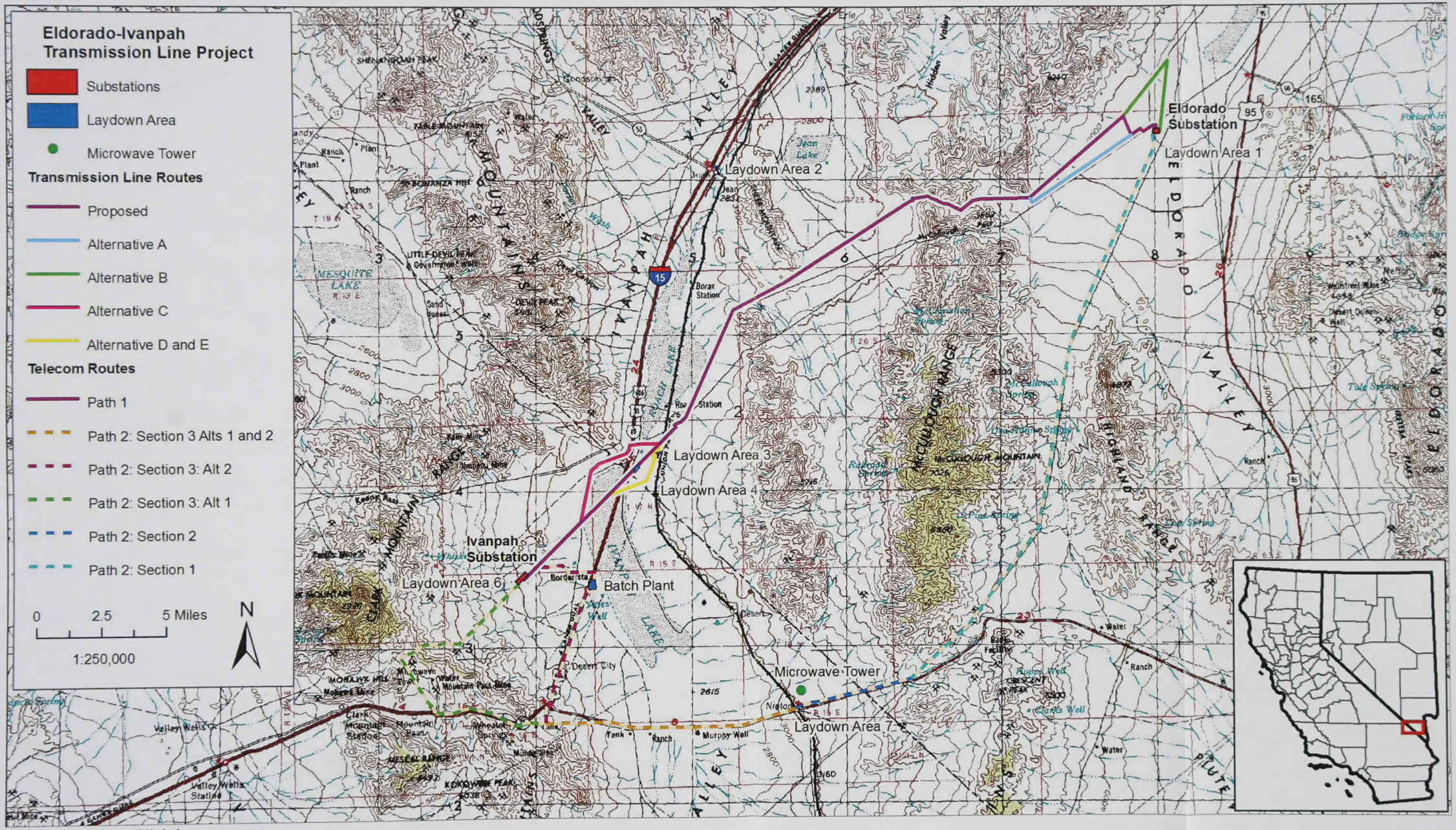
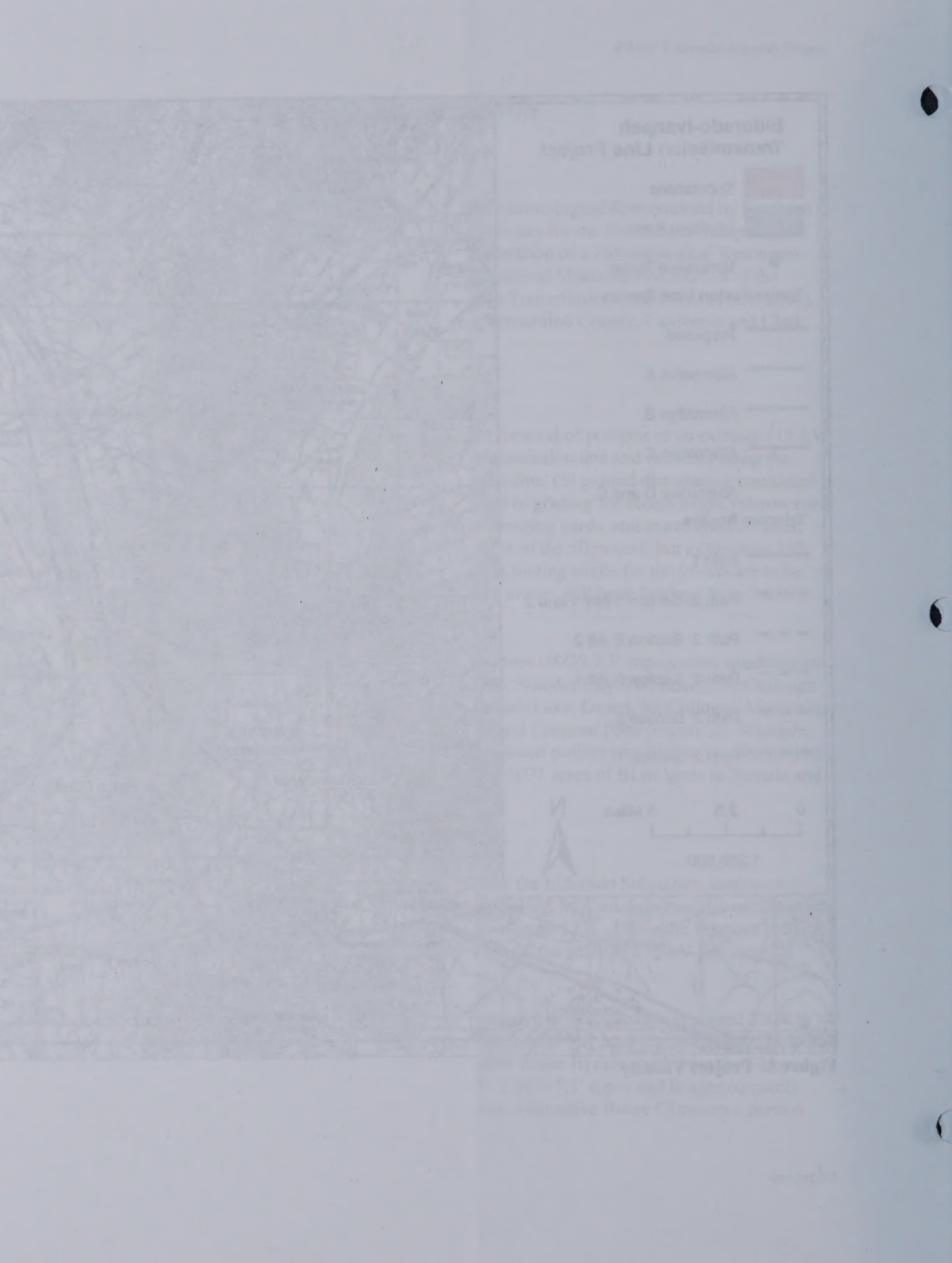


Figure 1. Project Vicinity



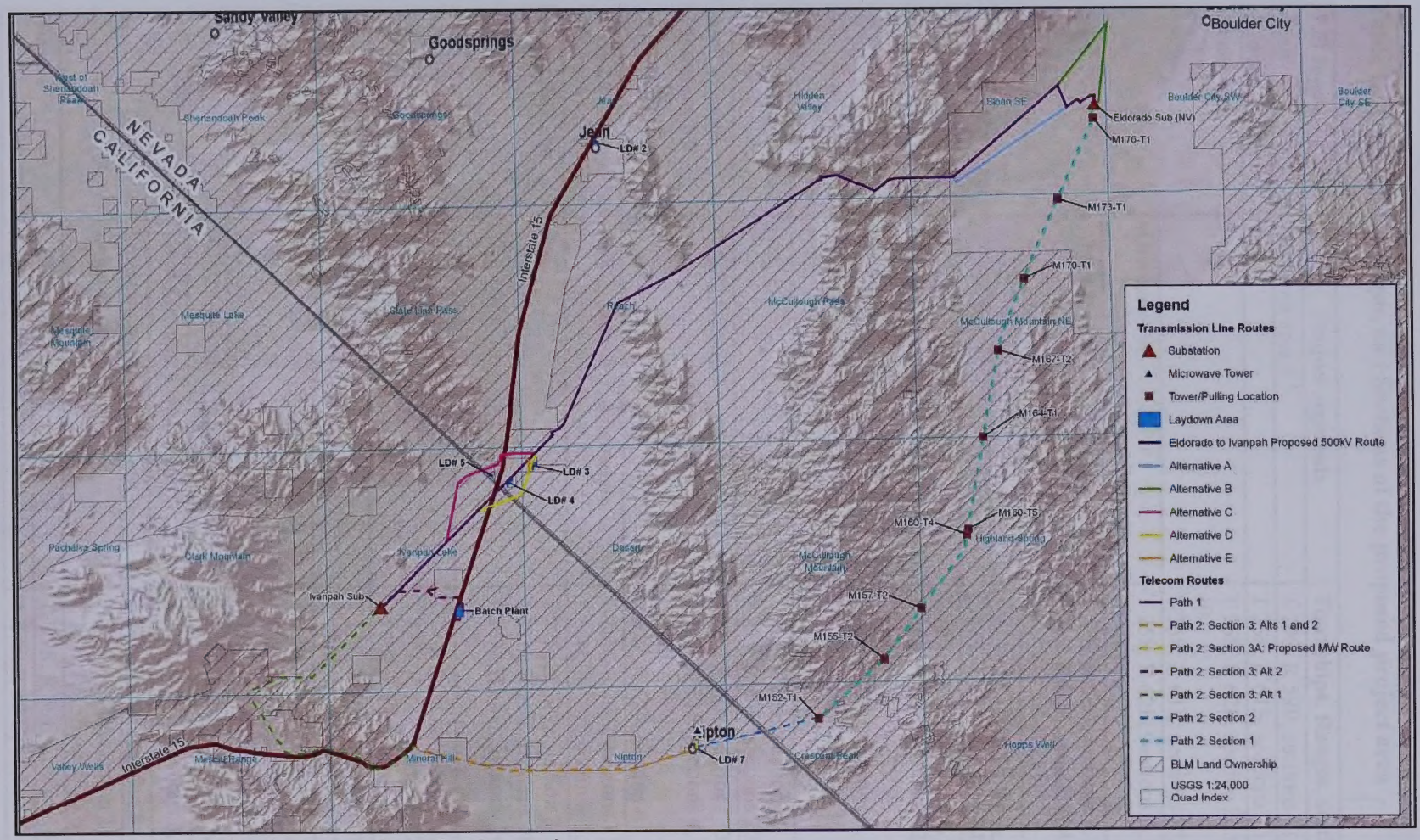


Figure 2. USGS 7.5 minute quadrangles for project

Table 1. Townships, Ranges, and Sections of the proposed project area

7.5' topo	Project segments	Townships, Ranges, sections
Jean	Laydown area 2	T 29S, R 59E, sections 11,12
Hidden Valley	Path 1	T 25S, R 61S, sections 23, 22, 21, 20, 19
Sloan SE	Path 1	T 25S, R 62E, section 2, 3, 4, 9, 17, 18, 19 T 25S, R 61E, sections 23, 24
	Alternative A	T 25S, R 62E, sections 2, 3, 9, 10, 16, 17, 18, 19
	Alternative B	T 25S, R 62E, sections 1, 3 T 24S, R 62E, sections 24, 25, 26, 35, 36
	Path 2, Section 1	T 25S, R 62E, sections 2, 11, 14, 22, 23,
Boulder City SW	Alternative B	T 24S, R 62E, sections 24, 25
Roach	Path 1	T 26S, R 60E, sections 4, 5, 7, T 26S, R 59E, sections 12, 34, 13, 23, 24, 35 T 27S, R 59E, sections 3, 8 T 25S, R 60E, section 33
McCullough Pass	Path 1	T 25S, R 61E, section 30 T 25S, R 60E, sections 25, 26, 34, 35
McCullough Mountain NE	Path 2, Section 1	T 25S, R 62E, sections 33, 34, 27 T 26S, R 62E, sections 4, 8, 9, 17, 20, 29, 32 T 27S, R 62E, section 6
Clark Mountain	Path 2, Section 3, Alternative 1	T 16N, R 14E, sections 17, 18 T 16N, R 13E, sections 1, 2
Ivanpah Lake	Path 1	T 27S, R 59 E, section 8 T 17N, R 15E, sections 18, 19 T 17N, R 14E, sections 24, 25, 26, 34, 35, 3
	Alternative C	T 27S, R 59 E, sections 4, 5, 7, 8 T 17N, R 14E, sections 12, 13, 24, 25 T 17N, R 15E, section 7
	Alternative D	T 27S, R 59E, sections 16, 17, 18 T 17N, R 15E, sections 17, 18
	Path 2, Section 3, Alternative 2	T 16N, R 14E, sections 1, 12, 13, 14, 23 T 17N, R 14E sections 1, 34, 35, 36 T 16N, R 14E section 3
	Path 2, Section 3, Alternative 1	T 16N, R 14E, sections 4, 8, 9, 17
	Laydown area 4	T 27S, R 59E, sections 8, 17
	Laydown area 5	T 27S, R 59E, section 8
	Batch Plant	T 16N, R 14E, section 1 T 16N, R 15E, section 6
Desert	Path 1	T 27S, R 59E, sections 4, 5
	Alternative C	T 27S, R 59 E, section 4

	Alternative D	T 27S, R 59E, sections 4, 9, 16
	Alternative E	T 27S, R 59E, section 9
	Laydown area 3	T 27S, R 59E, section 9
	Laydown area 4	T 27S, R 59E, section 9
McCullough Mountain	Path 2, Section 1	T 28S, R 61E, sections 2, 10, 11, 15, 16,
Highland Spring	Path 2, Section 1	T 28S, R 61E, section 2 T 27S, R 62E, sections 6, 7, 30, 18, 19, T 27S, R 61E, sections 25, 35, 36
Mescal Range	Path 2, Section 3, Alternative 1	T 16N, R 13E, section 2, 11, 12, 13 T 16N, R 14E, section 31, 32
Mineral Hill	Path 2, Section 3, Alternative 1	T 16N, R 14 E, sections 32, 33, 34 T 15N, R 14E, sections 21, 22
	Path 2, Section 3, Alternative 2	T 16N, R 14E, section 23, 26, 34, 35
	Path 2, Section 3, Alternative 1 & 2	T 15N, R 15E, sections 20, 21 T 16N, R 15E, section 31 T 16N, R 14E, sections 34, 35, 36
Nipton	Path 2, Section 3, Alternative 1 & 2	T 16N, R 16E, sections, 31, 32 T 15N, R 16E, sections 19 T 15N, R 15E, sections 21, 22, 23, 24
	Path 2, Section 2	T 16N, R 16E, sections 32, 33, 34
	Laydown area 7	T 16N, R 16E, section 33
Crescent Peak	Path 2, Section 1	T 26S, R 62E, section 20 T 28S, R 61E, sections 20, 21, 30
	Path 2, Section 2	T 16N, R 16E, sections 34, 35 T 28S, R 60E, sections 25, 26 T 28S, R 61E, section 30

of the Desert and Ivanpah Lake USGS 7.5' topos a near Primm, Nevada and is approximately 5.3 miles long. South Dry Lakes Reroute (Transmission Alternative Route D) covers a portion of the Desert and Ivanpah Lake USGS 7.5' topos a near Primm, Nevada and is approximately 3.3 miles long. South Dry Lakes Bypass (Transmission Subalternative Route E) crosses a portion of the Desert USGS 7.5' topos and is approximately 1 mile long.

SUBTRANSMISSION LINES

A 600- to 800-foot subtransmission line addition would connect the proposed Ivanpah Substation to the existing to an existing 115-kV line Ivanpah Lake USGS 7.5' topographic quadrangle. A one mile segment of distribution line on the Ivanpah Lake USGS 7.5' topo is planned to connect the existing Nipton 33-kV distribution line to the Ivanpah Substation provide light and auxiliary power. A second line, spanning ~4,300 feet over the Nipton USGS 7.5' topo is planned to connect the microwave tower to the Nipton 12-kV line.

SUBSTATIONS

The Ivanpah Substation would be a new construction, located ~5 miles southwest of Primm, Nevada. This would link the transmission line route with the telecommunications route. At the northern end of the proposed project area, the Eldorado Substation will be modified to accommodate the new 230-kV transmission line.

TELECOMMUNICATIONS

Telecom Route Path 1 is an overhead alignment that follows the proposed 230-kV transmission line from the Eldorado Substation southwest to the Ivanpah Substation. The alignment crosses the Sloan SE, Hidden Valley, McCullough Pass, Roach, Desert, and Ivanpah Lake USGS 7.5' topographic quadrangles (Figure 1, 2).

Telecom Route Path 2 Section 1 is an overhead line that would be strung along the existing Eldorado-Lugo transmission line. This line spans from the Eldorado Substation southwest over the Sloan SE, McCullough Mountain NE, Highland Spring, McCullough Mountain, and Crescent Peak USGS 7.5' topographic quadrangles. The entire segment is approximately 25.5 miles long. Near the Nevada-California boarder, the route transitions to the underground Telecom Route Path 2 Section 2 segment that covers a portion of the Crescent Peak and Nipton USGS 7.5' topos. The underground segment spans 4.8 miles along the northern edge of Nipton Road to Nipton, California. Additionally a microwave tower path would be installed between Nipton and the proposed Ivanpah Substation.

The Mountain Pass Telecom Route Telecom Route (Path 2 Section 3 Alternate 1) covers a portion of the Nipton, Mineral Hill, Mescal Range, Clark Mountain, and Ivanpah Lake USGS 7.5' topos and is approximately 25 miles long. This alternative would consist of a combination of fiber cable installed on existing Nipton 33-kV towers and underground cable. This route parallels Nipton Road from Nipton west to Interstate 15. There the route turns south paralleling Interstate 15 to Bailey Road in Mountain Pass, then northwest to the Mountain Pass substation, and finally northeast to the Ivanpah substation.

The Golf Course Telecom Route (Path 2 Section 3 Alternate 2) crosses a portion of the Nipton, Mineral Hill, and Ivanpah Lake USGS 7.5' topos and is approximately 20 miles long. This alternative would consist of a combination of fiber cable installed on existing Nipton 33-kV towers and underground cable. This route parallels Nipton Road from Nipton west to Interstate 15. There the route turns north paralleling Interstate 15 to Yates Well Road then turns west to the Ivanpah Substation.

PROJECT PERSONNEL

Cogstone Resource Management Inc. prepared this report. Sherri Gust served as the Principal Investigator for the project, wrote the management plan and edited the report. Gust is an associate of the Vertebrate Paleontology and Rancho La Brea sections of the Natural History Museum of Los Angeles County, has a BLM paleontology permit and certification as a qualified

paleontologist in numerous California counties. She has an M.S. in Anatomy (Evolutionary Morphology) from the University of Southern California, a B.S. in Anthropology from the University of California, Davis and over twenty-five years of experience in California.

Kim Scott conducted the background research and wrote the assessment portions of the report. Scott has a B. S. in Geology with an emphasis in Paleontology from the University of California, Los Angeles and over 10 years of experience in California paleontology and geology. Molly Valasik prepared the maps for the report and assisted with the survey. Valasik has a M.A. in Anthropology from Kent State University in Ohio and experience in Southern California archaeology with cross training in paleontology. Lindsey Andrews assisted with the survey. Andrews is a qualified archaeologist and cross-trained paleontologist with over three years experience. Qualifications of project personnel are provided (Appendix A).

REGULATORY ENVIRONMENT

This project is subject to federal, state and local legislation and guidelines regarding paleontological resources. For this project, federal regulations apply since most of the project in across BLM lands.

FEDERAL LAWS AND REGULATIONS

PALEONTOLOGICAL RESOURCES PRESERVATION ACT

The Paleontological Resources Preservation Act (Public Law 111-011, Title VI, Subtitle D on Paleontological Resources Preservation) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on Federal land using scientific principles and expertise. The law affirms the authority for many of the policies the Federal land managing agencies already have in place for the management of paleontological resources such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locality data. It only applies to Federal lands. It provides authority for the protection of significant paleontological resources on Federal lands including criminal and civil penalties for fossil theft and vandalism. The act states (in part):

a) The term ''paleontological resource'' means any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth.
b) The Secretary shall manage and protect paleontological resources on Federal land using scientific principles and expertise.
c) The Secretary shall develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources, in accordance with applicable agency laws, regulations, and policies. These plans shall emphasize interagency coordination and collaborative efforts where possible with non-Federal partners, the scientific community, and the general public.

d) A paleontological resource may not be collected from Federal land without a permit issued under this subtitle by the Secretary.
e) The Secretary may issue a permit for the collection of a paleontological resource pursuant to an application if the Secretary determines that:

    1) the applicant is qualified to carry out the permitted activity;
    2) the permitted activity is undertaken for the purpose of furthering paleontological knowledge or for public education;
    3) the permitted activity is consistent with any management plan applicable to the Federal land concerned; and
    4) the proposed methods of collecting will not threaten significant natural or cultural resources.

f) A permit for the collection of a paleontological resource issued under this section shall contain such terms and conditions as the Secretary deems necessary to carry out the purposes of this subtitle. Every permit shall include requirements that:

    1) the paleontological resource that is collected from Federal land under the permit will remain the property of the United States;
    2) the paleontological resource and copies of associated records will be preserved for the public in an approved repository, to be made available for scientific research and public education; and
    3) specific locality data will not be released by the permittee or repository without the written permission of the Secretary.

g) Any paleontological resource, and any data and records associated with the resource, collected under a permit, shall be deposited in an approved repository. The Secretary may enter into agreements with non-Federal repositories regarding the curation of these resources, data, and records.
h) Information concerning the nature and specific location of a paleontological resource shall be exempt from disclosure under section 552 of title 5, United States Code, and any other law unless the Secretary determines that disclosure would further the purposes of this subtitle, not create risk of harm to or theft or destruction of the resource or the site containing the resource and be in accordance with other applicable laws. [BLM 2009]

FEDERAL POTENTIAL FOSSIL YIELD CLASSIFICATION SYSTEM

The Federal Potential Fossil Yield Classification (PFYC) System was developed by the USDA Forest Service and refined by the BLM. Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

Using the Potential Fossil Yield Classification (PFYC) system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or

plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mapable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis, and should be used to assist in determining the need for further mitigation assessment or actions.

The descriptions for the classes below are written to serve as guidelines rather than as strict definitions. Knowledge of the geology and the paleontological potential for individual units or preservational conditions should be considered when determining the appropriate class assignment. Assignments are best made by collaboration between land managers and knowledgeable researchers.

Class 1 – **Very Low**. Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.
- Units that are Precambrian in age or older.

(1) Management concern for paleontological resources in Class 1 units is usually negligible or not applicable. (2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

Class 2 – **Low**. Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

(1) Management concern for paleontological resources is generally low. (2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

Class 3 – **Moderate** or **Unknown**. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low.
- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

Class 3a – **Moderate Potential.** Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but is somewhat higher for common fossils.

Class 3b – **Unknown Potential.** Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

(1) Management concern for paleontological resources is moderate; or cannot be determined from existing data. (2) Surface-disturbing activities may require field assessment to determine appropriate course of action.

This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-

disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

Class 4 – **High**. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases.

Class 4a – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.

Class 4b – These are areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action. (2) A field survey by a qualified paleontologist is often needed to assess local conditions. (3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered. (4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 5 – **Very High**. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

Class 5a – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.

Class 5b – These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 5 areas is high to very high. (2) A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. (3) Official designation of areas of avoidance, special interest, and concern may be appropriate.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities. (BLM 2007)

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA declares that it is state policy to "take all action necessary to provide the people of this state with...historic environmental qualities." It further states that public or private projects financed or approved by the state are subject to environmental review by the state. All such projects, unless entitled to an exemption, may proceed only after this requirement has been satisfied. CEQA requires detailed studies that analyze the environmental effects of a proposed project. In the event that a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered.

SAN BERNARDINO COUNTY LAWS AND REGULATIONS

Paleontological resources are protected by county ordinances. This protection covers all vertebrate fossils (animals with backbones) and any unique paleontological locality.

The County of San Bernardino (Development Code §82.20.040) defines a qualified vertebrate paleontologist as meeting the following criteria:
Education: An advanced degree (Masters or higher) in geology, paleontology, biology or related disciplines (exclusive of archaeology).
Professional experience: At least five years professional experience with paleontologic (not including cultural) resources, including the collection, identification and curation of the resources.

The County of San Bernardino (Development Code §82.20.030) requires that paleontologic mitigation programs include, but not be limited to:

(a) Field survey before grading. In areas of potential but unknown sensitivity, field surveys before grading shall be required to establish the need for paleontologic monitoring.
(b) Monitoring during grading. A project that requires grading plans and is located in an area of known fossil occurrence, or that has been demonstrated to have fossils present in a field survey, shall have all grading monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Paleontologic monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring is not necessary if the potentially-fossiliferous units described for the property in question are not present, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.
(c) Recovered specimens. Qualified paleontologic personnel shall prepare recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils is essential in order to fully mitigate adverse impacts to the resources.

(d) Identification and curation of specimens. Qualified paleontologic personnel shall identify and curate specimens into the collections of the San Bernardino County Museum (SBCM), Division of Geological Sciences, an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation and CEQA compliance. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until curation into an established museum repository has been fully completed and documented.
(e) Report of findings. Qualified paleontologic personnel shall prepare a report of findings with an appended itemized of specimens. A preliminary report shall be submitted and approved before granting of building permits, and a final report shall be submitted and approved before granting of occupancy permits. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into the collections of the SBCM, will signify completion of the program to mitigate impacts to paleontologic resources.

DEFINITION OF SIGNIFICANCE FOR PALEONTOLOGICAL RESOURCES

Only qualified, trained paleontologists with specific expertise in the type of fossils being evaluated can determine the scientific significance of paleontological resources. Fossils are considered to be significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;

2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;

3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;

4. The fossils demonstrate unusual or spectacular circumstances in the history of life;

5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

As so defined, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer 2003).

APPLICANT PROPOSED MEASURES

APM PALEO-1: Retention of Paleontologist and Preparation of a Paleontological Resource Management Plan. Prior to construction, a certified paleontologist would be retained by SCE to supervise monitoring of construction excavations and to produce a Paleontological Resource Management and Monitoring Plan (PRMMP) for the proposed project. This PRMMP would be prepared and implemented under the direction of the paleontologist and would address and incorporate APMs PALEO-2 through PALEO-8. Paleontological monitoring would include inspection of exposed rock units and microscopic examination of matrix to determine whether fossils are present. The monitor would have authority to temporarily divert grading away from exposed fossils in order to recover the fossil specimens. More specific guidelines for paleontological resource monitoring could be found in the PRMMP.

APM PALEO-2: Pre-construction Paleontological Filed Survey. The paleontologist and/or his or her designated representative would conduct a pre-construction field survey of the project area underlain by Tertiary rock units and older alluvium. Results of the field inventory and associated recommendations would be incorporated into the PRMMP.

APM PALEO-3: Worker Environmental Awareness Program (see BIO-6, CR-2b, W-11). A Worker Environmental Awareness Program would be provided to construction supervisors and crew for awareness of requirements regarding the protection of paleontological resources and procedures to be implemented in the event fossil remains are encountered by ground-disturbing activities.

APM PALEO-4: Construction Monitoring. Ground-disturbing activities would be monitored on a part-time or full-time basis by a paleontological construction monitor only in those parts of the project area where these activities would disturb previously undisturbed strata in rock units of moderate and high sensitivity. Quaternary alluvium colluvium, and Quaternary landslide deposits have a low paleontological sensitivity level and would be spot-checked on a periodic basis to ensure that older underlying sediments were not being penetrated. Monitoring would not be implemented in areas underlain by younger alluvium unless these activities had reached a depth 5 feet below the present ground surface and fine-grained strata were presents. Ground-disturbing activities in areas underlain by rock units of low sensitivity would be monitored on a quarter-time basis or spot-checked if fine grained strata were present.

APM PALEO-5: Recovery and Testing. If fossils were encountered during construction, construction activities would be temporarily diverted from the discovery and the monitor would notify all concerned parties and collect matrix for testing and processing as directed by the project paleontologist. In order to expedite removal of fossil-bearing matrix, the monitor may request heavy machinery to assist in moving large quantities of matrix out of the path of construction to designated stockpile areas. Construction would resume at the discovery location once the necessary matrix was stockpiled, as determined by the paleontological monitor. Testing of stockpiles would consist of screen washing small samples to determine if important fossils were present. If such fossils were present, the additional matrix from the stockpiles would be

water screened to ensure recovery of a scientifically significant sample. Samples collected would be limited to a maximum of 6,000 pounds per locality.

APM PALEO-6: Monthly Progress Reports. The project paleontologist would document interim results of the construction monitoring program with monthly progress reports. Additionally, at each fossil locality, field data forms would record the locality, stratigraphic columns would be measured, and appropriate scientific samples would be submitted for analysis.

APM PALEO-7: Analysis of and Preparation of Final Paleontological Resource Recovery Report. The project paleontologist would direct identification, laboratory processing, cataloging, analysis, and documentation of the fossil collections. When appropriate, and in consultation with SCE, splits of rock or sediment samples would be prepared for curation (see APM PALEO-8). A final technical report would be prepared to summarize construction monitoring and present the results of the fossil recovery program. The report would be prepared in accordance with SCE, Society of Vertebrate Paleontology guidelines, and lead agency requirements. The final report would be submitted to SCE, the lead agency, and the curation repository.

APM PALEO-8: Curation. Prior to construction, SCE would enter into a formal agreement with a recognized museum repository, and would curate the fossil collections, appropriate field and laboratory documentation, and final Paleontological Resource Recovery Report in a timely manner following construction.

BACKGROUND

REGIONAL SETTING

The physiographical, geological, and ecological zones represented in the project area are best described as the mountains and alluvial valleys of the eastern Mojave Desert and southern Basin and Range Geomorphic Provinces. Local extension has created subparallel, fault-bounded mountains with steeply climbing western slopes and shallowly dipping eastern slopes throughout the Basin and Range and in the eastern Mojave Desert. These north-south trending ranges are interrupted by valleys with internal drainage systems that contained lakes during Ice Ages (note pale areas on Figure 3) and playas during Interglacials (Wagner 2002).

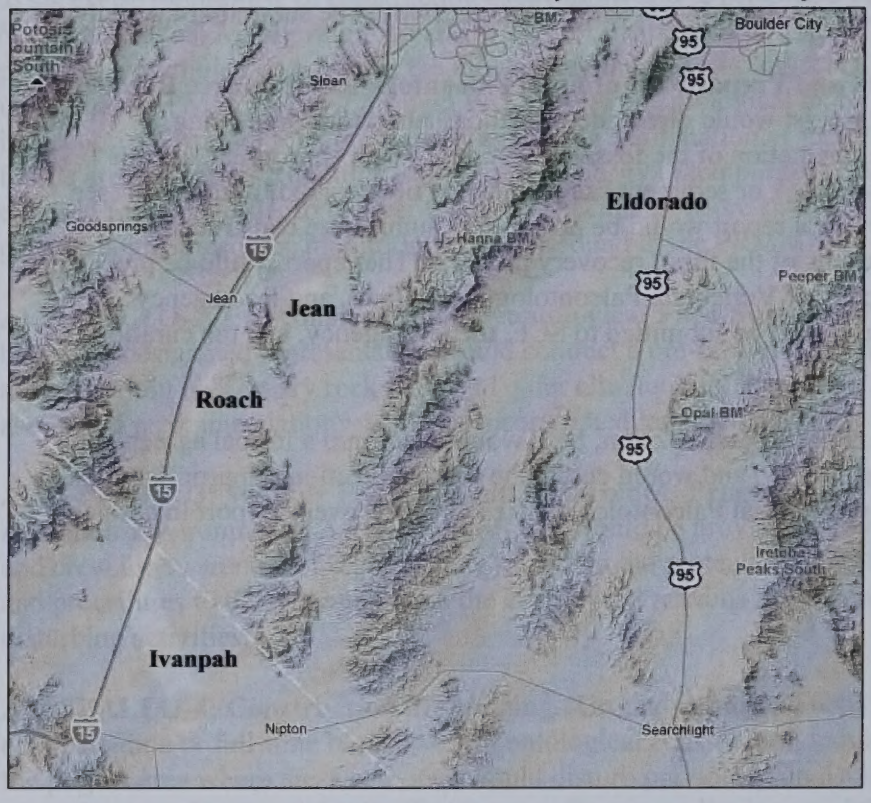


Figure 3. Topography of project area showing Pleistocene Lakes

Pleistocene pluvial lakes are known to have overflowed into those downstream during very wet periods so that they were linked together. Studies from more southerly lakes show strong time series shifts from a summer-rain-sourced lakes to a winter-precipitation-sourced lakes. Many were deposited in a fluctuating environment of shallow lakes and mudflats. Millennial- to centennial-scale cycles of wet and dry periods may be recorded by alternating soils and fluvial, shallow-lake, and mudflat beds (Reheis and Bright n.d.).

Most of the project is proposed in valley sediments consisting of playas and bajadas. Playas are flat bottomed depressions which are periodically covered by water. Bajadas consist of broad slopes of debris often formed by coalescing of several alluvial fans. These sediments include alluvium, gravels and dolomite. Where portions of mountains are crossed by the project, the rock units are Precambrian metamorphic rocks or Tertiary Volcanics.

STRATIGRAPHY

The Eldorado-Ivanpah Transmission Line Project passes through several geological formations including Quaternary playa deposits, Quaternary alluvium, Quaternary older alluvium, Plio-Pleistocene gravels, Tertiary volcanics, Cambrian to Devonian Goodsprings Dolomite, and Precambrian metamorphics (Figure 4, 5; Hewitt 1931, 1956, Jennings 1961, Longwell et al. 1965, Bingler and Bonham 1973).

PRECAMBRIAN METAMORPHIC ROCKS

Precambrian (>543 million years old) hornblende-biotite gneiss and schist with lenses of quartzite (epЄ) are found within the Path 2, Section 3, Alternate 1 alignment on the Clark Mountain 7.5' USGS topographic quadrangle (Figure 5a; Jennings 1961). Precambrian biotite gneiss (bgn) is found within the Path 2, Section 1 alignment on the McCullough Mountain and Crescent Peak 7.5' USGS topographic quadrangles (Figure 5d). This quartzo-feldspathic biotite gneiss is dark brown to dark grey (Bingler and Bonham 1973). Additionally undivided Precambrian quartzo-feldspathic gneiss and quartz-mica schist (pЄu; gn) are found within the Roach and Hidden Valley 7.5' USGS topographic quadrangle (Figure 5b; Bingler and Bonham 1973, Longwell et al. 1965). Although these deposits probably originated as sediments, extreme metamorphism has destroyed any potential fossil material.

CAMBRIAN TO DEVONIAN GOODSPRINGS DOLOMITE

The Goodsprings Dolomite (DЄg) corresponds to Middle Cambrian to Ordovician (?) (513-443(?) million years old) formations including the Bonanza King Formation, the Nopah Formation, the Pogonip Group and the Ely Springs Dolomite (Gans 1970, 1974). Although these units can be recognized in other areas of the Mojave Desert, they are not broken out in the project area (Longwell et al. 1965). This unit consists of light to dark grey dolomite interbedded with thin-bedded light yellowish-grey, silty shales (Longwell et al. 1965). In its type section at Sheep Mountain, this unit is 2,475 ft (750 m) thick and lies between the Middle Cambrian Bright Angel Shale (= Carrara Formation) and the Middle Devonian Sultan Formation (Cooper 1987). . Fossils from this formation are rare and typically planktonic, although some echinoid fossils are also known. The Goodsprings Dolomite is found along the Alternative C alignment in the Ivanpah Lake 7.5' USGS topographic quadrangle (Figure 5b; Hewett 1956, Longwell et al. 1964).

Limestone and dolomite has the potential to form cave systems which are excellent at preserving fossil materials. Carnivores, rodents, birds, nocturnal animals, and occasionally herbivores use caves as dens and bring fossil material into the cave system. Accidental entrapments where animals fall into caves and can't escape also bring fossils into caves. Because the fossils are protected from the elements they are preserved and eventually buried. The conditions within caves in the southwestern United States are so good for preserving fossils that fragments of mummified remains, plants, and dung have all been recovered from these cave systems. Any caves within the project area require thorough searching for fossilized materials. Caves containing fossils are highly significant for science and will require special measures.

TERTIARY VOLCANICS

Undifferentiated middle Tertiary (50-15 million years old) volcanics (Tv) are mapped along the proposed 230-kV transmission line route within the Hidden Valley and Sloan SE 7.5' USGS topographic quadrangles (Figure 5b, 5c; Longwell et al. 1964). Fossils from volcanics are very rare, although they can occur in ash deposits. Rare molds are also found in volcanic deposits and record the shapes of trees and rarely animals.

PLIO-PLEISTOCENE GRAVELS

Mapped along the Path 2, Section 1 telecom route in the Highland Spring 7.5' USGS topographic quadrangle, these Plio-Pleistocene (5 million - 11,0000 year old) gravel to boulder conglomerates and fanglomerates (QTg) are weakly to well lithified, tilted and highly dissected (Figure 5d; Bingler and Bonham 1973). Occasional paleosols are also present in these deposits.

QUATERNARY OLDER ALLUVIUM

Found within the Clark Mountain and Mescal Range 7.5' USGS topographic quadrangles in the Path 2, Section 3, Alternative 1 portion of the alignment (Figure 5a; Jennings 1961), the Quaternary older alluvium (Qc) is composed of massive to poorly sorted, poorly bedded, sands, pebbles and cobbles (Jennings 1961). The coarse grained nature of these sediments indicates that they are the remnants of proximal alluvial fans. These Pleistocene (2.6 million years old to 11,000 years old) alluvial fans have been exposed near Mountain Pass by recent uplift.

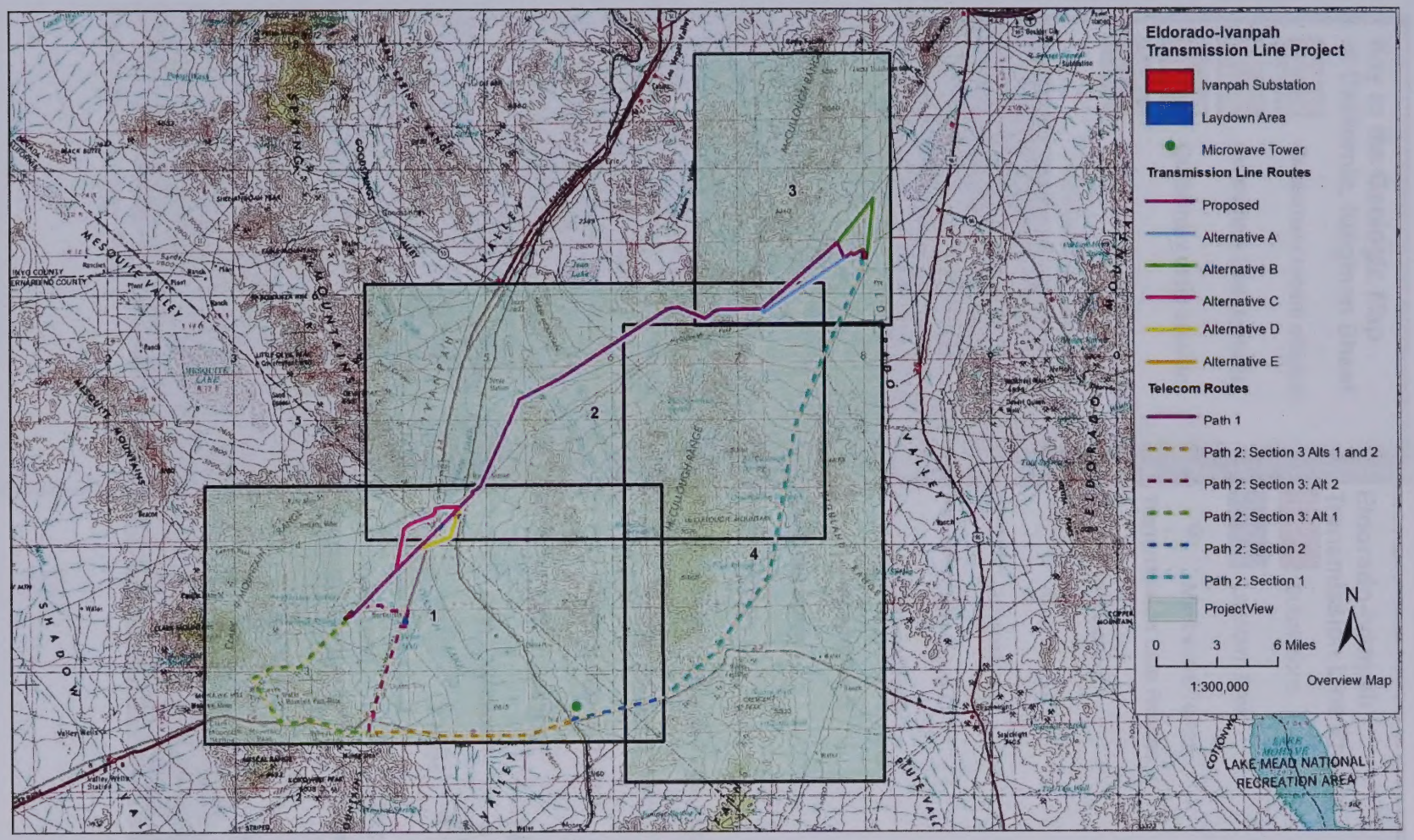


Figure 4. Overview Geology Map

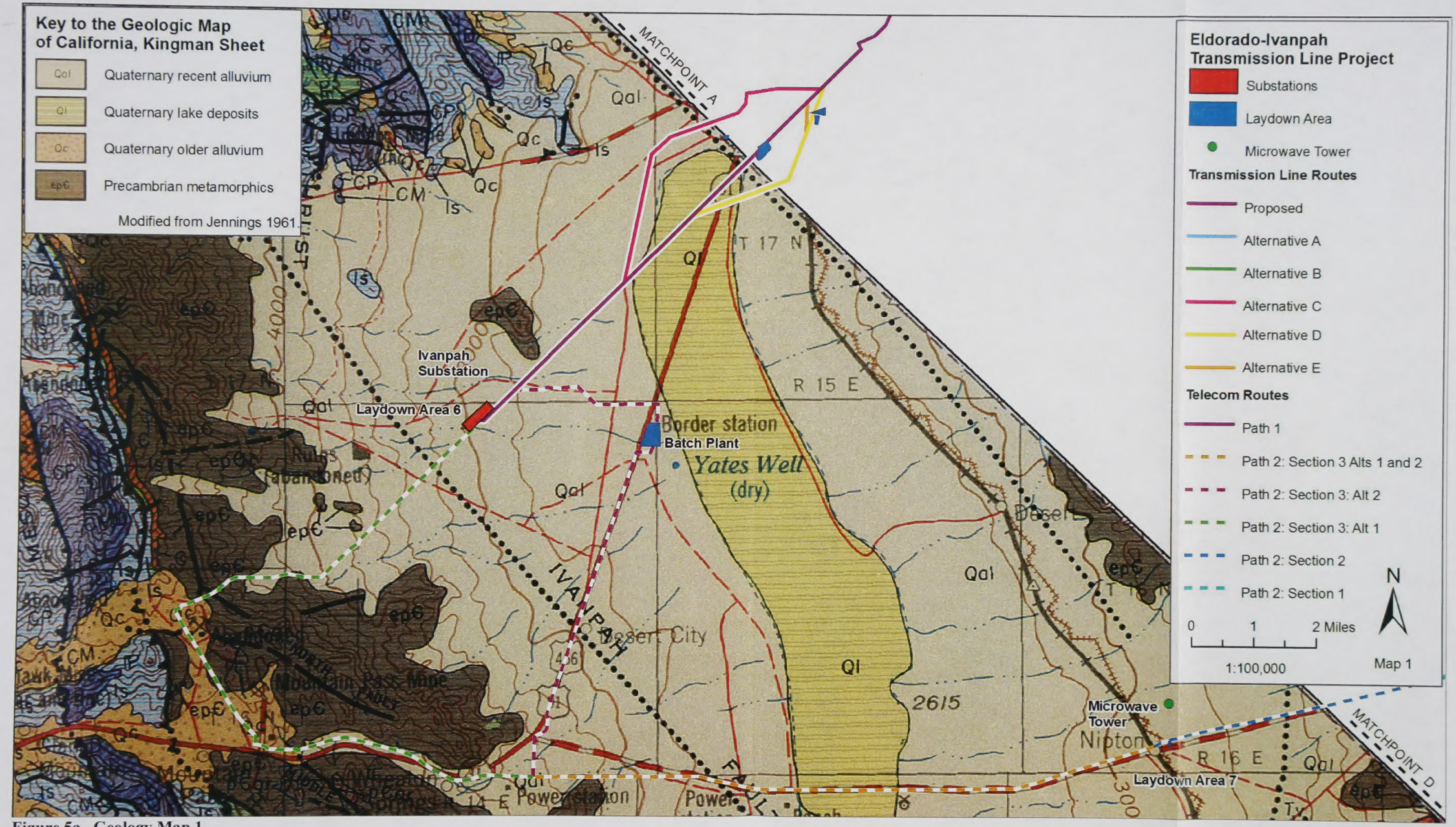


Figure 5a. Geology Map 1

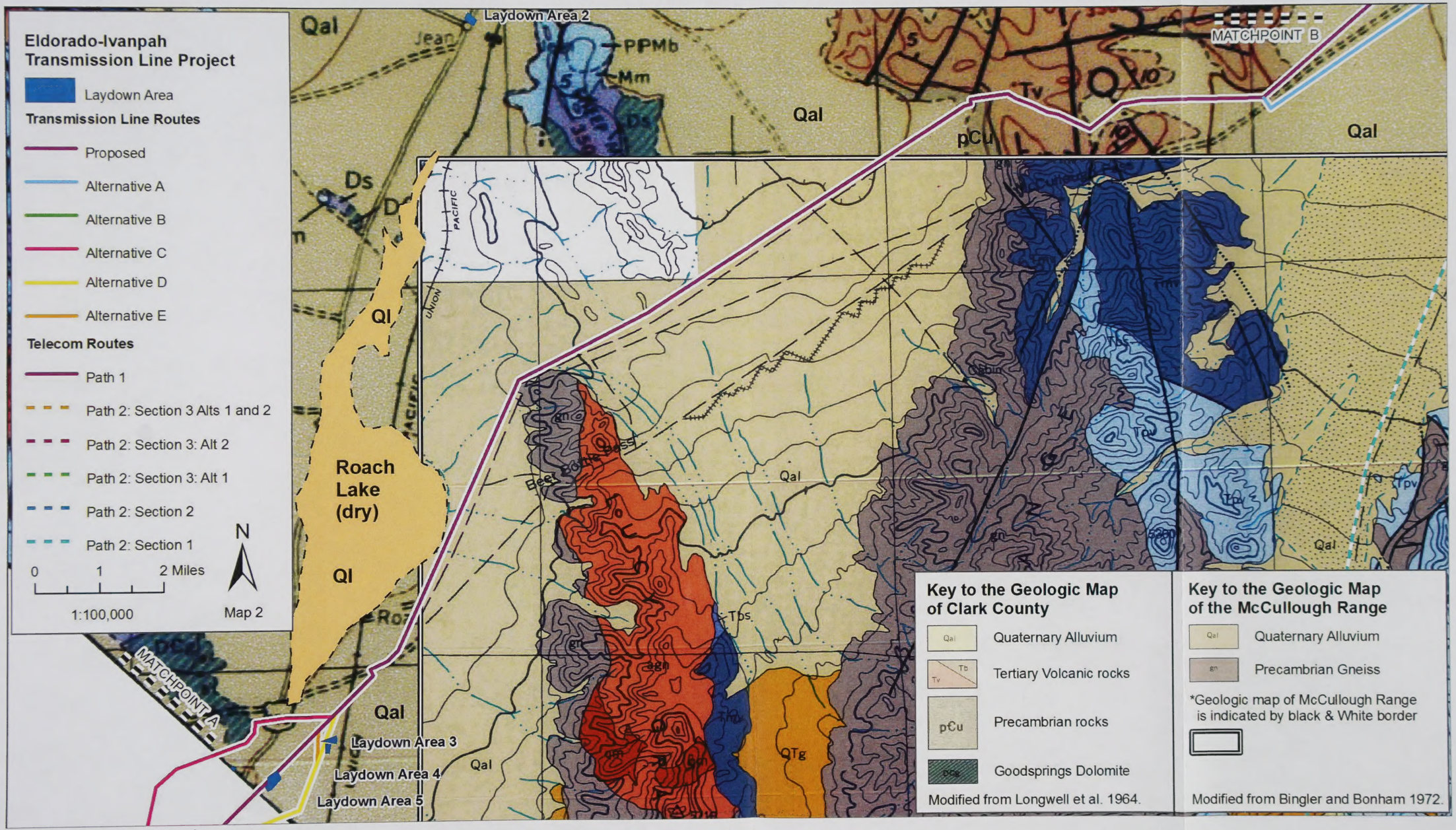


Figure 5b. Geology Map 2

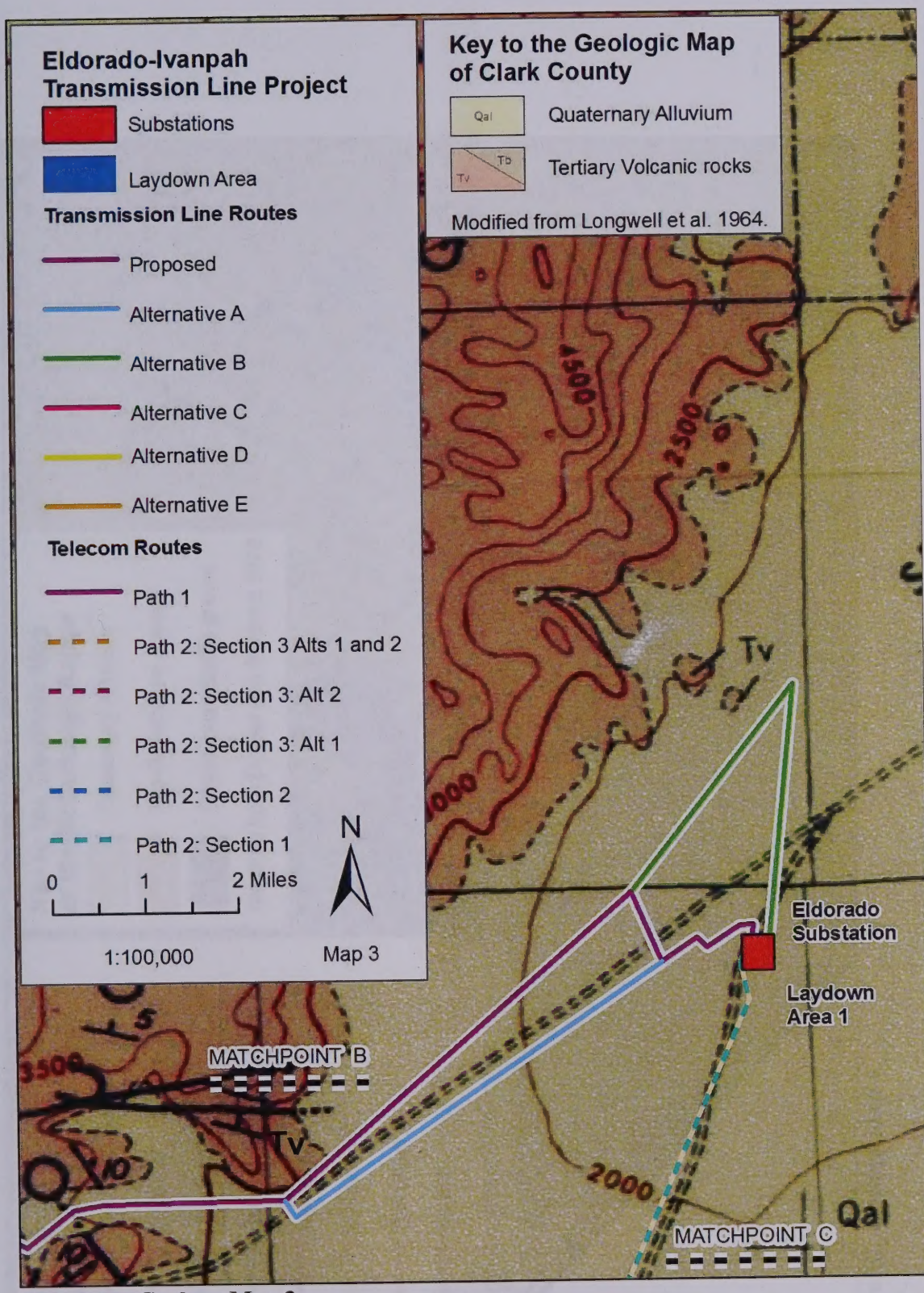


Figure 5c. Geology Map 3

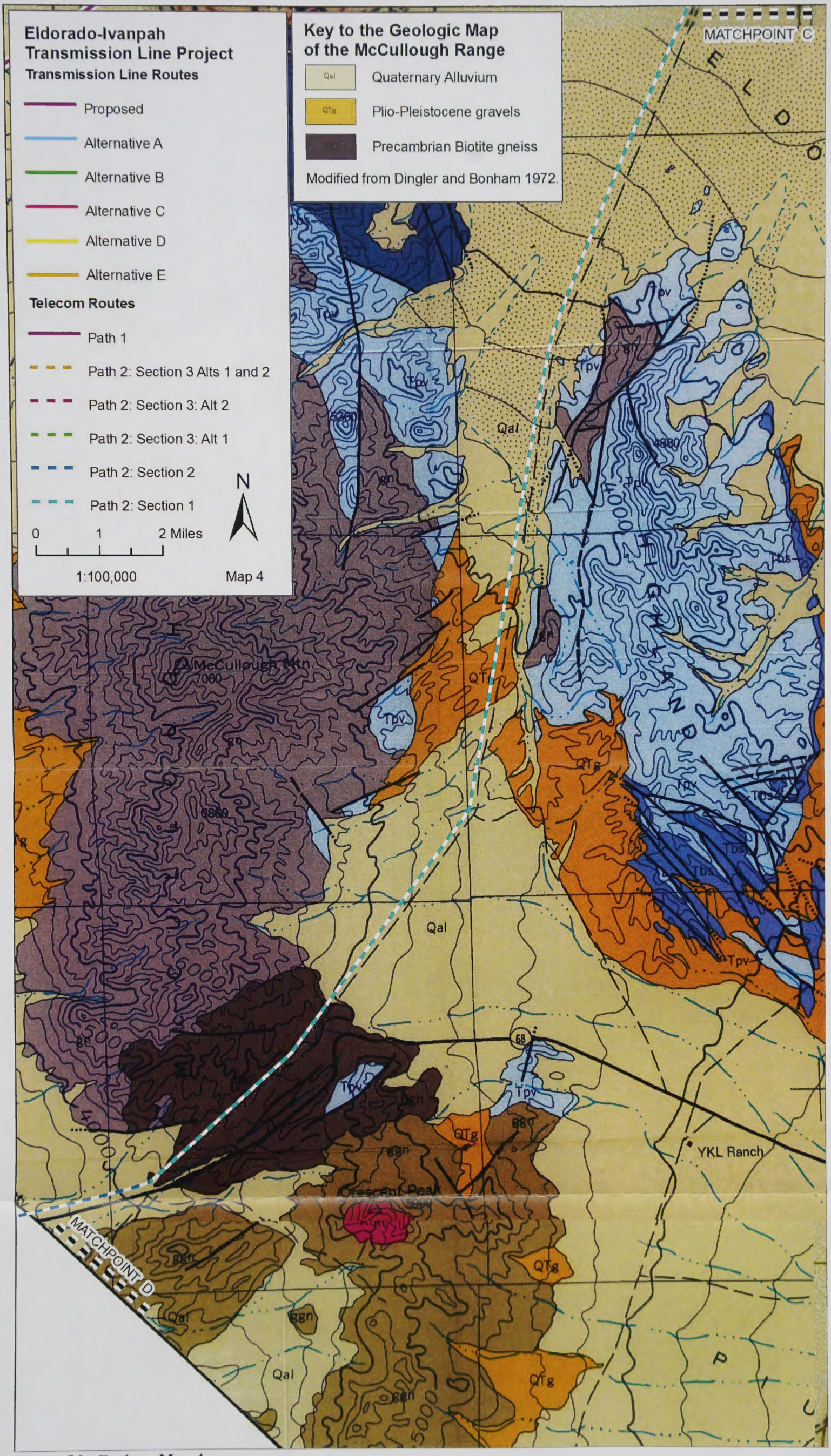


Figure 5d. Geology Map 4

RECORD SEARCH RESULTS

A paleontological records search for the alignments was conducted in 2008 by the San Bernardino County Museum (SBCM; Scott 2008; Appendix B). Additional searches were conducted in online databases of the Los Angeles County Museum Department of Invertebrate Paleontology (LACMIP 2010) and the Museum of Paleontology (UCMP 2010) and in the literature (Hay 1937; Jefferson 1991a, b; Table 2).

There are no known fossils in the project area. The literature and records search resulted in several fossil localities recorded near the alignment (Table 2). The Quaternary alluvium has produced indeterminate large mammal remains while the highstand of Ivanpah Lake has produced desert tortoise, rodent and identifiable plant remains (Scott 2008).

Table 2. Known fossil localities near the project area

Formation	Common name	Taxon	Location	Reference
Quaternary playa	hackberry	*Celtis* sp.	Ivanpah Lake 7.5' topo, T17N, R14E, sections 35 and 36; highstand of Ivanpah Lake	SBCM 1.2.1 – 1.2.4; Scott 2008
	desert tortoise	*Gopherus* sp.		
	kangaroo rat	*Dipodomys* sp.		
	wood rat	*Neotoma* sp.		
	indeterminate small vertebrates	Vertebrata		
Quaternary alluvium	large mammal	Mammalia	Ivanpah Lake 7.5' topo, T17N, R15E, sections 37; 300' northwest of the alignment	SBCM 1.2.5; Scott 2008; Scott pers. comm. 2010

Generally, other pluvial lakes have yielded abundant middle to late Pleistocene vertebrate fossils in addition to paleoenvironmentally important micro fossils like ostracods. The vertebrate fossils include birds, mammals, fish, reptiles and amphibians, many now extinct.

FIELD SURVEY

SURVEY METHODS

The potential project route and alternates were surveyed August 2-6 and 8-12, 2010 as required by APM PALEO-2. Work was conducted under BLM Fieldwork Authorizations N-88500, signed July 23, 2010, and CA-6910-16P, signed July 15, 2010. Kim Scott directed the survey. Survey crew members were Molly Valasik and Lindsey Andrews.

A 200 foot wide corridor was assessed. Sediments conducive to fossil preservation were initially assessed by windshield survey. Where fine-grained deposits occurred, and for washes where the sediments might be viewed at depth in natural cuts, pedestrian survey was performed at 50 to 100 foot intervals (Figure 6).

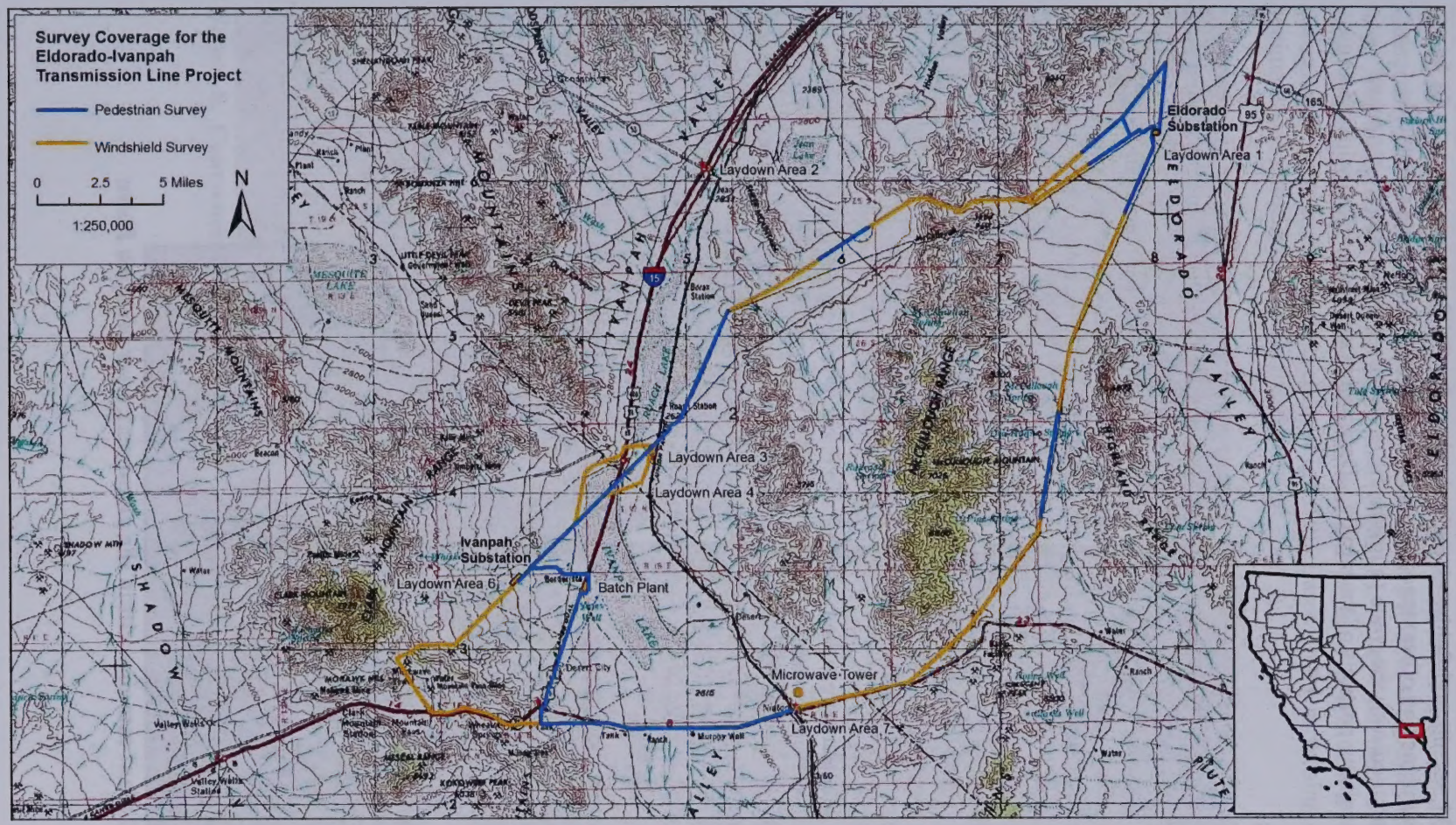


Figure 6. Survey Coverage Map

Surveyors carried BLM permits and fieldwork authorizations for California and Nevada, BLM fossil locality sheets, cameras and other standard gear. Each surveyor carried a Trimble® GeoXH unit preprogrammed with the route to insure the surveyors were within the proposed alignment during the walking portions of the survey. Data points were also taken with the units.

SURVEY RESULTS

Desert environments often exhibit deflation surfaces when deposition slows in an area. Wind removes the finer materials leaving gravel, pebbles, and cobbles in a desert pavement. Due to this natural process, geologists can glimpse the grain size of the sediments in an area. Fossils are much less likely to be preserved in coarser grained environments and those areas were eliminated from the pedestrian survey. Approximately half of the route was selected for pedestrian survey.

No vertebrate fossil remains were encountered during the survey. This is not unusual as a majority of the potentially fossiliferous sediments were covered with Holocene alluvium. One plant locality was discovered in the Quaternary alluvium adjacent to Ivanpah Lake.

QUATERNARY DEPOSITS

Within the Quaternary alluvium, near the Ivanpah Lake playa, a Holocene or late Pleistocene plant site was identified in a small channel, one meter below the modern surface (2010KMS0809.1). The plant remains were carbonized, but twig fragments were identified in the wall (Figure 7; Appendix C). It is likely that some of the plant remains will be identifiable to at least family and that the fragments may yield a radiocarbon date. Identifying and dating the plants would help to assess the age of these sediments and help to locate the Holocene-Pleistocene boundary in the area.

Figure 7. Carbonized plant remains within the alignment, near Ivanpah Playa

Based on the grain size of the Quaternary deposits at the surface and within wash cuts, only the Quaternary playa and the Quaternary alluvium within 1 mile of the playa deposits are considered to be potentially sensitive for fossil material (Figure 8). Away from the playas, the Quaternary alluvium transitioned into middle and proximal alluvial fan deposits with an increasing percentage of cobble and boulder clasts (Figure 9). Based on the increasing grain size, these sediments are unlikely to contain fossil material.

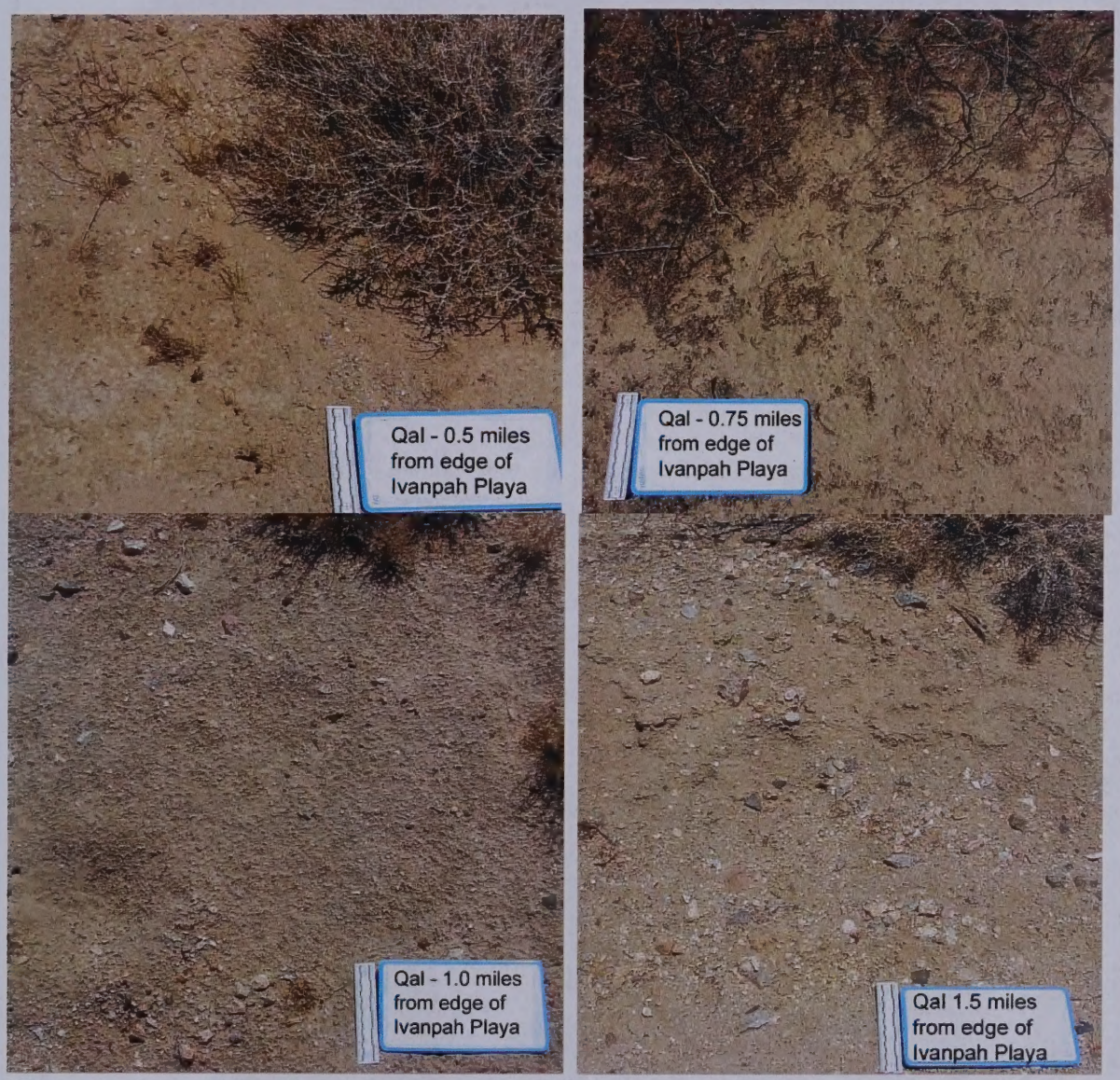

Qal - 0.5 miles from edge of Ivanpah Playa
Qal - 0.75 miles from edge of Ivanpah Playa
Qal - 1.0 miles from edge of Ivanpah Playa
Qal 1.5 miles from edge of Ivanpah Playa

Figure 8. Coarseness of sediments in road cut at various distances from Ivanpah Playa

Figure 9. Proximal alluvial fan deposit in Ivanpah Valley

OLDER DEPOSITS

The Quaternary older alluvium includes proximal alluvial fan deposits associated with Mountain Pass. These deposits were typified by coarse sands to cobble sized clasts with very little fine grained material (Figure 10). In the McCullough Range, the Quaternary-Tertiary Gravels were moderately to well-lithified deposits of cobble to boulder conglomerates and fanglomerates (Figure 10). From the coarseness of the materials viewed, neither unit has much potential to contain fossil materials.

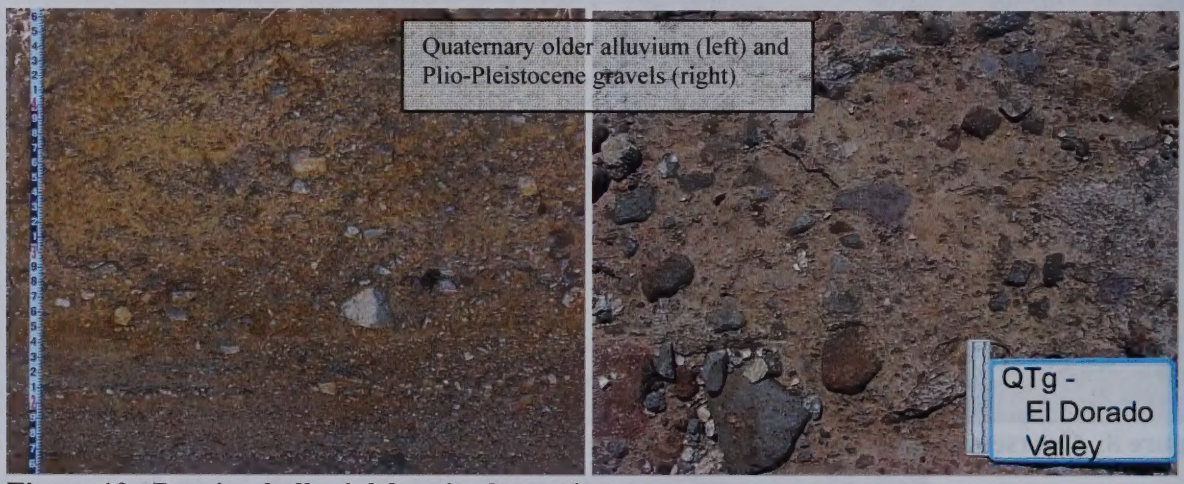


Figure 10. Proximal alluvial fans in the project area

The Tertiary volcanics in the alignment consisted entirely of felsic lava flows. No ashes or other potentially fossil preserving materials were observed. Near Primm, the small outcrop of Cambrian-Devonian (?) Goodsprings Dolomite (Figure 11) was searched for fossils *in situ* as well as cave deposits, but none was observed. The Precambrian metamorphics were assessed to confirm the geologic maps were correct and that no other units were present in the area.

Figure 11. An outcrop of Goodsprings Dolomite

PALEONTOLOGICAL SENSITIVITY

The results indicate that much of the project has low sensitivity (Table 3, Figure 12). Formations which have low or no sensitivity are the Goodsprings Dolomite, the Tertiary volcanics, and the Precambrian metamorphic rocks. However these units may have fossil deposits in caves or woodrat middens. These units should be monitored for fossil deposits on a spot check basis during non-drilling excavation activities.

Using the PFYS areas of uncertain paleontological sensitivity (3b) are units that exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information, about the paleontological resources of the unit or the area, is known. This usually indicates the unit or area is poorly studied. Formations of this classification requiring full time monitoring include the Quaternary playas and Quaternary alluvium within ½ of a mile of the playa deposits.

Based on the coarseness of the sediments at the surface, field evaluation of sediments is recommended for the Quaternary alluvium within one mile of the playa deposits to confirm appropriate level of monitoring. Additionally the Plio-Pleistocene gravels and Quaternary older alluvium should be evaluated for the same reason. Although these units are too coarse overall to have fossils preserved, they may contain paleosols that were not encountered during the survey and should be spot checked during non-drilling excavation activities. Field evaluation entails searching for finer grained sediments or other fossil containing units that may not have been evident during the survey. The project paleontologist will determine if additional monitoring is necessary based on the construction plans, field visits and weekly updates.

Table 3. PFYS Results with mitigation

Period	Millions of Years Before Present	Epoch	Very Low Sensitivity (PFYS 1) Spot checks for caves/woodrat middens	Low Sensitivity (PFYS 2) Spot checks for caves, woodrat middens, grain size	Undetermined Sensitivity (3b) Full time monitoring
Quaternary	< 0.01	Holocene		Quaternary alluvium (Qa, Qal)	Quaternary playa (Ql)
	2.6	Pleistocene		Quaternary older alluvium (Qc) (gravel sized)	Quaternary older alluvium (finer sediments subsurface and adjacent to playas)
Tertiary	5.3	Pliocene		Plio- Pleistocene gravels (QTog)	
Devonian	417	------			
Silurian	443	------			
Ordovician	490	------			
Cambrian	543	------		Goodsprings Dolomite (DЄg)	
Early, Middle and Late Precambrian	3800	------	Precambrian metamorphics (epЄ; gn, bgn, pЄu)		

Figure 12a. Paleontological Sensitivity Map 1

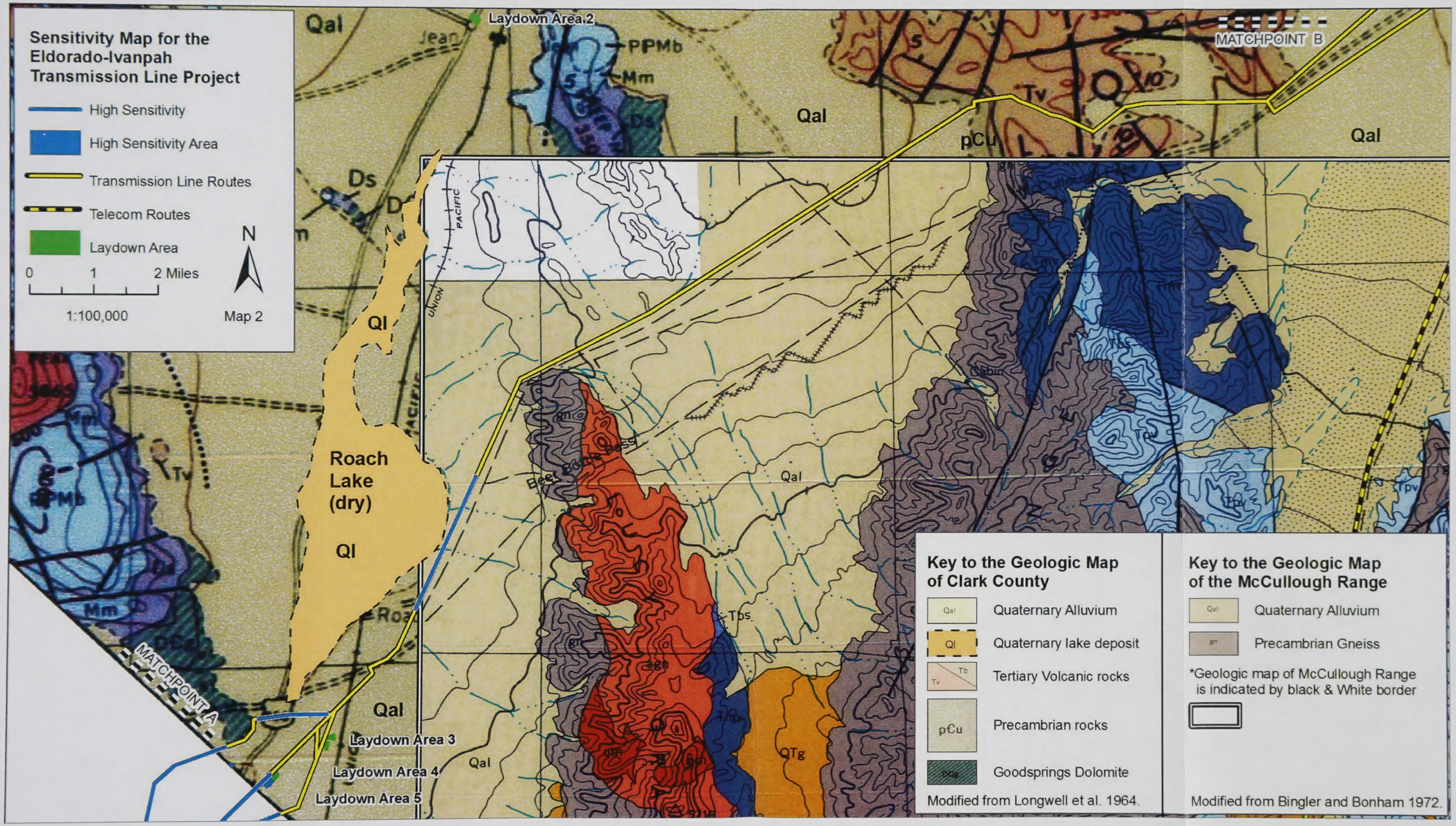


Figure 12b. Paleontological Sensitivity Map 2

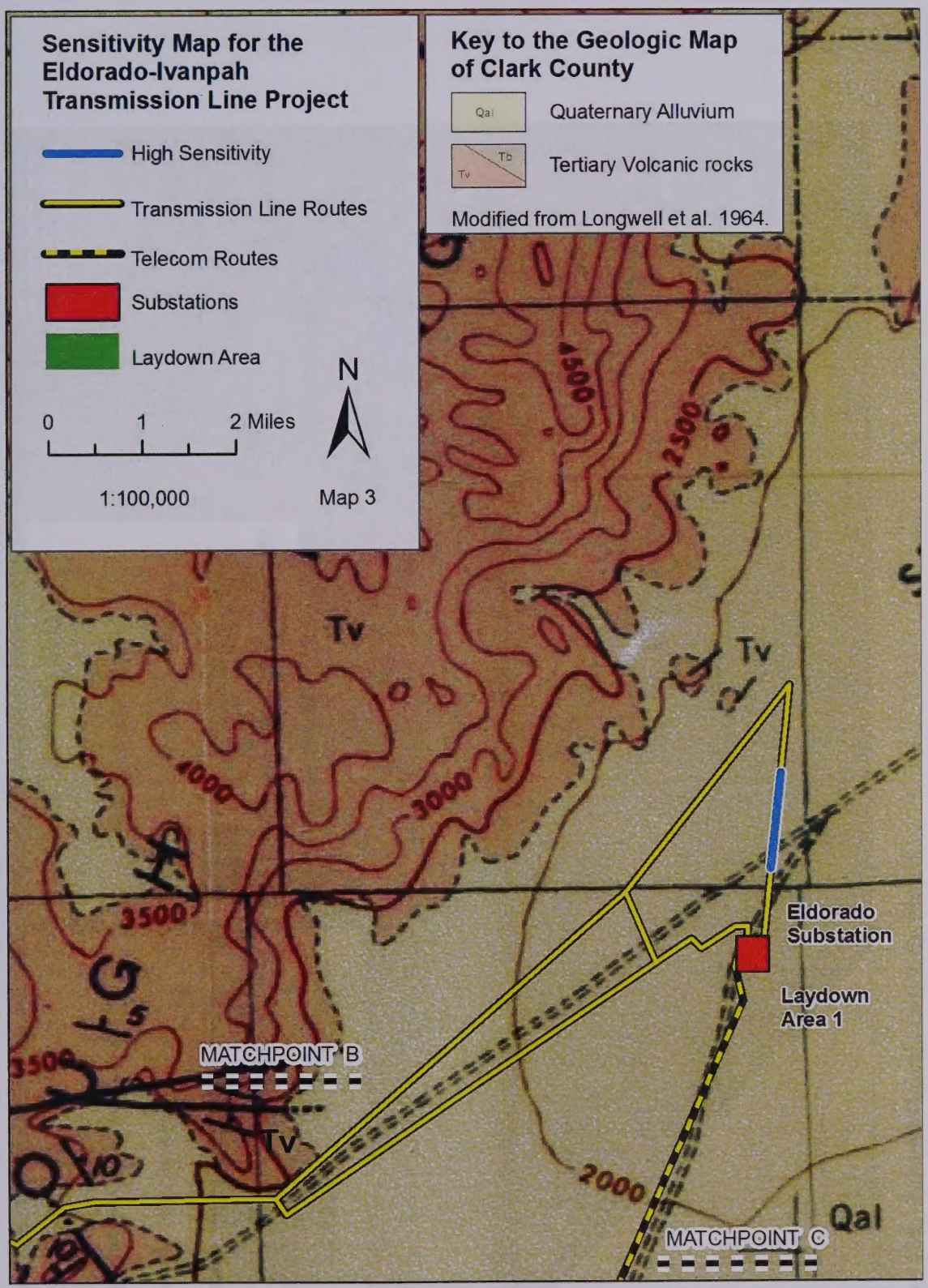


Figure 12c. Paleontological Sensitivity Map 3

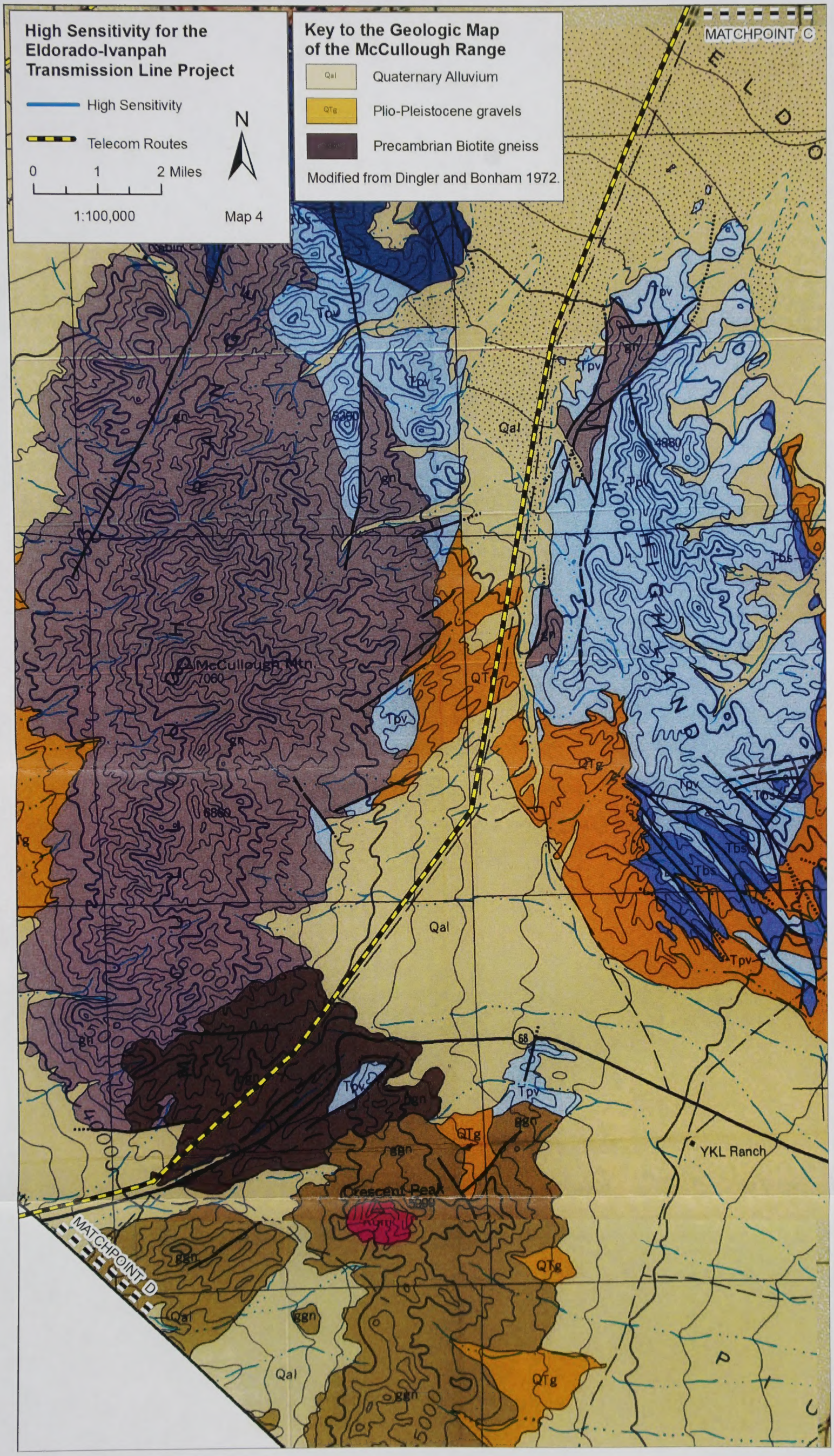


Figure 12d. Paleontological Sensitivity Map 4

PALEONTOLOGICAL RESOURCES MANAGEMENT PLAN

INTRODUCTION

Cogstone Resource Management Inc. is the qualified paleontological firm retained by Southern California Edison, to provide paleontological services for the Eldorado to Ivanpah Transmission Line Project. Applicant Proposed Measures PALEO 1-8 (Table 4) of the Environmental Impact Report for the Eldorado-Ivanpah Transmission Line Project will be or have been implemented. Applicant Proposed Measure 2 has been completed and is reported above. APM 1 requires preparation of this Paleontological Resources Management Plan (PRMP). APMs 3-8 relate to implementation of the PRMP. Southern California Edison has determined that work on all portions of the route will meet federal standards. Implementation of the PRMP will guide and facilitate the identification and treatment of paleontological resources located during the project in an effort to reduce adverse effects on significant resources. All BLM permit conditions will apply (Appendix E).

Table 4. APM status

APM	Short Description	Completed	Planned
1	Prepare PRMP	This report	
2	Preconstruction Survey	This report	
3	Prepare worker training		Will coordinate with SCE
4	Construction monitoring		In this document
5	Recovery and Testing		In this document
6	Monthly Progress Reports		In this document
7	Analysis and Final Report		In this document
8	Curation		In this document

This PRMP summarizes identified paleontologically sensitive areas within and adjacent to the project area, the organization and responsibilities of the monitors, the responsibilities of other parties and the treatment and communications procedures to be implemented if paleontological resources are encountered during the project.

IDENTIFIED ENVIRONMENTALLY SENSITIVE AREAS

Areas of potentially high paleontological sensitivity (geological formations that may produce significant, non-renewable vertebrate and invertebrate fossil resources) for this project are within and near Quaternary Lake beds and require full-time monitoring (refer to Figure 11).

Based on the coarseness of the sediments at the surface, field evaluation of sediments is recommended for the Quaternary alluvium within one mile of the playa deposits to confirm

appropriate level of monitoring. Additionally the Plio-Pleistocene gravels and Quaternary older alluvium should be evaluated for the same reason. Although these units are too coarse overall to have fossils preserved, they may contain paleosols that were not encountered during the survey and should be spot checked during non-drilling excavation activities. Field evaluation entails searching for finer grained sediments or other fossil containing units that may not have been evident during the survey. The project paleontologist will determine if additional monitoring is necessary based on the construction plans, field visits and weekly updates.

Based on the coarseness of the sediments at the surface, field evaluation of sediments is recommended for the Quaternary alluvium within one mile of the playa deposits to confirm appropriate level of monitoring. Additionally the Plio-Pleistocene gravels and Quaternary older alluvium should be evaluated for the same reason. Although these units are too coarse overall to have fossils preserved, they may contain paleosols that were not encountered during the survey and should be spot checked during non-drilling excavation activities. Field evaluation entails searching for finer grained sediments or other fossil containing units that may not have been evident during the survey. The project paleontologist will determine if additional monitoring is necessary based on the construction plans, field visits and weekly updates.

The results indicate that much of the project has low sensitivity. Formations which have low or no sensitivity are the Goodsprings Dolomite, the Tertiary volcanics, and the Precambrian metamorphic rocks. However these units may have fossil deposits in caves or woodrat middens and should be monitored for fossil deposits on a spot check basis during non-drilling excavation activities.

MONITORING

PERSONNEL ORGANIZATION

A formal organization of paleontological monitoring procedures and personnel is established to ensure timely and accurate communication and implementation of standardized procedures necessary to minimize adverse effects on significant paleontological resources discovered during earth disturbing activities.

Southern California Edison (SCE) Project Archaeologists and BLM staff are responsible for paleontological resources management oversight. SCE's Project Archaeologists are responsible for final decisions regarding the issuance and duration of any temporary work stoppage. Environmental oversight will be the responsibility of Southern California Edison Environmental staff and BLM staff. The SCE Project Archaeologist will be responsible for final decisions regarding the issuance and duration of any formal Suspend Work Orders.

The principal project paleontologist has earned a graduate degree and has many years of experience thus exceeding the minimum federal standards (equivalent to *Secretary of Interior's Professional Qualification Standards for Archaeology* (36 CFR § 61). The project principal paleontologist is a contractor to Southern California Edison and holds BLM permits and fieldwork authorizations for this project in California and Nevada.

PALEONTOLOGICAL MONITORS

Qualified (minimum of bachelors degree with paleontological training and experience) paleontological monitors, salvage and laboratory crew and supervisory personnel will provide paleontological services under the supervision of the project principal paleontologist. Generally, one monitor will be sufficient. Scheduling of removal and construction activities may require additional monitors when multiple locations are being worked concurrently. The decision to add monitors will be made in consultation with the SCE Project Archaeologist.

COMMUNICATION

Monitors will act to protect potentially significant paleontological resources (including direct notification to construction personnel on site) and then notify the earthmoving contractor's job supervisor and the paleontological field supervisor of the find. The monitor will estimate the time required to recover the fossil as part of that notification. If work will be diverted for more than two hours or if the construction personnel are not cooperative with the monitor, the paleontological field supervisor will discuss the situation with the Edison Cultural Resources Coordinator. The SCE Project Archaeologist will make final decisions regarding formal Work Stoppage orders and disputes between parties. Temporary halt work conditions will be in effect until the SCE Project Archaeologist has made a decision regarding treatment. The SCE Project Archaeologist will also notify the BLM contact when significant finds area made on BLM lands (Appendix D).

TRAINING

All project personnel shall receive training prior to commencement of work. Specific training requirements are presented below as they apply to project personnel.

Paleontological Personnel

All paleontological personnel will receive a copy of this paleontological resources management plan, daily forms and appropriate maps. The field director will review project geology, specific paleontological concerns and BLM conditions with all crew. All paleontological personnel will receive Southern California Edison mandated safety training and environmental awareness training before performing any field work on the project.

Construction Field Personnel Environmental Resources Briefing

Southern California Edison will prepare Environmental Awareness Training, including a paleontological resources section, which is mandatory for all personnel. Attendance rosters will be submitted to verify training and hard-hat stickers issued.

Monitor's Authority to Temporarily Halt Project Activities

The monitor is empowered to temporarily redirect earthmoving to permit recovery of potentially significant fossils. It is important that all earthmoving contractor personnel recognize the authority of the monitor to redirect them. The monitor will attempt to minimize schedule impacts. The monitor will stay with the fossil and utilize a cell phone to contact the contractor's job supervisor, the paleontological supervisor or field director and the SCE Project Archaeologist. If phone communication is problematic, the monitor will demarcate a buffer zone around the specimen using flagging on lath and speak personally with the job supervisor. The SCE Project Archaeologist for the project will be responsible for final decisions regarding the issuance and duration of any formal Suspend Work Orders.

Monitoring Schedule, Methods and Documentation

The paleontological monitor will observe and inspect all earthmoving in native sediments designated as having high paleontological sensitivity. Additional monitoring will be performed where depth of impacts will remove sediments of low paleontological sensitivity to reveal sediments of high paleontological sensitivity and in response to finds reported by construction personnel. Monitoring will include inspection of exposed cut surfaces and microscopic examination of exposed sediments for microfossils.

The paleontological monitor is responsible to maintain close communication with the on-site earthmoving personnel in order to maintain a safe working environment and to be fully appraised of the upcoming areas of impact and any schedule changes.

The paleontological monitor is responsible to complete daily documentation of monitoring presence (Daily Log of Activities) and daily documentation of monitoring activities including the location of monitoring activities throughout the day and the type, observations of sediment type and distribution, observations regarding fossils, collection of fossils and other information (Daily Field Monitoring Summary and Daily Fossil Collection Log). The paleontological monitor is responsible to photograph activities, sediments and paleontological resources for documentation purposes and to fill out a Photograph Record Sheet for each digital roll. Paperwork and photographs will be submitted at the end of each week along with the monitor's timesheet.

The Daily Log of Activities will be uploaded to Southern California Edison's project site for their records. The Daily Field Monitoring Summary, Daily Fossil Collection Log and Photograph Record Sheet comprise the field notes and will be filed with the project principal paleontologist and submitted to the repository along with any significant fossils upon completion of the project.

The paleontological monitor is also responsible to document compliance and safety violations. Incident reports will include a summary of the violation, identification of the responsible party or parties, to whom the incident was reported and what action was taken to resolve the situation.

Photographic documentation should be attempted when feasible. Further action regarding reported incidents will be at the discretion of the SCE Project Archaeologist.

REPORTING

The Daily Log of Activities will be the basis to prepare the Weekly Summary of Activities for submittal to Southern California Edison. If fossils are recovered, additional documentation regarding lab work will also be incorporated. These records and the field notes will be used to prepare a monthly letter report. The monthly reports will summarize the monitoring activities of the previous period, discoveries made, progress of lab work, incidents and actions taken.

Upon conclusion of earthmoving, a final mitigation compliance report will be prepared. The final report will include the inclusive dates of monitoring, personnel utilized including qualifications, summarize the monitoring effort and coverage using text and maps, documentation of paleontological localities discovered, paleontological resources identified, interpretation of fossils, non-compliance issues and their resolution, evaluation of the adequacy of this paleontological resources management plan and suggestions for improving paleontological resource monitoring procedures and include all specialists' reports as appendices. The BLM guidelines for report standards and contents will be followed (Appendix E).

Copies of the final report will go to Southern California Edison, the California Public Utilities Commission, the BLM Needles and Las Vegas Field Offices.

DISCOVERY AND TREATMENT OF FOSSILS

FOSSIL DISCOVERY AND RECOVERY

Fossils observed will be treated differently depending on type and circumstance. Generally, discovery of identifiable invertebrate (shells, crustaceans, etc.) fossils requires a scientifically significant sample be collected for identification and analysis and that the locality be documented (see below). Similar procedures are followed for microvertebrates such as rodents. Current professional standards call for testing of 200 lb. samples (5 full 5 gallon buckets) from each locality followed by processing of up to 6000 lbs. of matrix if significant fossils are recovered by testing (SVP 1991,1995, 1996). Documentation of localities is required.

Larger fossils observed must be evaluated to determine their condition. Generally the monitor will be able to quickly determine if the fossils are sufficiently well-preserved to meet preliminary significance criteria. If necessary, the monitor will cordon off the immediate area around the fossil to permit a safe work zone to recover the fossil and notify the construction foreman. The monitor will also immediately notify the field supervisor if assistance is needed and sufficient personnel to perform the work will be fielded. Documentation of localities is required.

Discovery of a bone bed or other type of fossil sites containing multiple large fossils will likely require a formal Stop Work order. The monitor will cordon off the area until evaluation occurs. The project principal paleontologist will consult with the SCE Project Archaeologist regarding

the amount of time necessary. This type of discovery requires a detailed field map, a sedimentary structure analysis, one or more stratigraphic columns and data for taphonomic analysis.

Depending on the formations being impacted additional samples collected may include specimens for dating analyses or materials for microfossil, botanical or pollen analyses. All fossils and specimens are accompanied by a field tag with project and locality information including a unique number.

Locality Documentation

Every fossil locality requires a standard set of data be taken. The BLM locality form will be utilized (Appendix E). This includes one or more UTM readings using a global positioning system unit, an accurate elevation measurement if possible, the depth below surface, a lithology and true north reading. Additional information collected may include one or more stratigraphic columns, sedimentary structure analysis, taphonomic analysis and photographs of the fossil in situ. Depending on the formations being impacted additional samples collected may include specimens for dating analyses or materials for microfossil, botanical or pollen analyses.

Fossil Preparation

Many fossils require only cleaning and stabilization through the use of hardeners. Others require lab excavation of plaster jackets with gradual cleaning and hardening. Sometimes larger fossils require a "cradle", usually a form-fitted plaster lined with acid-free cloth to provide support and prevent breakage during storage or transport. Fossils found in bedrock formations may require more tedious preparation using mechanical devices such as zip scribes.

Processing of matrix samples for microvertebrates varies depending on the nature of the sediments and may be washed using water, may require chemical agents to break apart the rock or may require floatation using heavy liquids.

Fossil Identification

All fossils will be identified by experts. All identifications will be as specific as possible and include element, portion, side, sex, age, taphonomy and notes. Cataloging, including identification information, is entered into a computer database. Each specimen in maintained with a tag specifying the provenience and identification information.

Fossil Analyses

Analyses conducted depend to a great extent on the number of fossils recovered and their condition. Guild analysis (relative number of carnivores, herbivores and omnivores of various body weights in an ecosystem), demographic analysis (age and sex structure of populations), habitat analysis (certain types of animals indicate grasslands as opposed to deserts for example), paleoecology (use of botanical and/or pollen analysis to reconstruct the paleoenvironment) and comparative analysis (comparison to other faunas of the same time period regionally) are the most typical. Geological context analyses include stratigraphy of the fossil deposits, dating (to

narrow the time range of the fossils), taphonomy (history of alteration of the fossils by scavengers, water transport, etc.) and other ancillary studies.

REPOSITORY

The San Bernardino County Museum (SBCM) will be the repository for fossils recovered on this project (Appendix F). The BLM permits and fieldwork authorizations are based on use of this repository. Funds for curation will be the responsibility of Southern California Edison. The project principal paleontologist is authorized to submit fossils with accompanying deeds of gift for curation on behalf of Southern California Edison. BLM required repository information will be prepared and supplied to SCE and BLM (Appendix E).

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APPENDIX A: QUALIFICATIONS

SHERRI GUST
Project Manager & Principal Investigator, Paleontology and Archaeology

EDUCATION

1994 M. S., Anatomy (Evolutionary Morphology), University of Southern California, Los Angeles
1979 B. S., Anthropology (Physical), University of California, Davis

SUMMARY QUALIFICATIONS

Gust has more than 30 years of experience in California, acknowledged credentials for meeting national standards, and is a certified/qualified principal archaeologist and paleontologist in all California cities and counties that maintain lists. She holds BLM permits in paleontology and cultural resources. Gust is an Associate of the Natural History Museum of Los Angeles County in the Vertebrate Paleontology and Rancho La Brea Sections. She is a Member of the Society of Vertebrate Paleontology, Society for Archaeological Sciences, Society for Historical Archaeology, the Society for California Archaeology and others. She has special expertise in the identification and analysis of human, animal and fossil bone. In addition, she is a Reader at the Huntington Library and has performed extensive archival research.

SELECTED PROJECTS

Tehachapi Renewable Transmission Project, Segments 1-3. Paleontological resources management plans, Phase I activities, archaeological and paleontological monitoring, artifact and fossil recovery, lab work, GIS mapping, multiple supplement survey and variance reports for construction of new electrical transmission facilities in Los Angeles and Kern Counties. Project Manager and Principal Archaeologist for Cogstone's work and Principal Paleontologist for entire project. 2007-9.

El Casco Transmission Project. Conducted preconstruction mitigation measures and prepared Paleontological Resources Treatment Plan for new SCE transmission project in Riverside County. Project Manager and Principal Paleontologist. 2009.

San Bernardino County Road Improvement Projects. Paleontological Identification Reports, Paleontological Evaluation Reports and Paleontological Mitigation Plan for projects including I10, SR58, SR138, SR247. Conducted paleontological monitoring for SR138, recovered significant fossils and prepared Paleontological Mitigation Report. Project Manager and Principal Paleontologist. 2005-present.

SR178 Widening Project. Historic Property Survey Report with appended Archaeological Survey Report and Paleontological Identification Report, Paleontological Evaluation Report and Paleontological Mitigation Plan for 8 mile segment east of Bakersfield. Project Manager and Principal Paleontologist and Archaeologist. 2007-9.

First Street Trunk Line Water Project. Paleontological assessment and monitoring of installation of new water main in Los Angeles. Project Manager and Principal Paleontologist. 2006-9.

Irvine Business Complex. Archaeological and Paleontological Evaluation of business complex with recent high density housing additions in Irvine, California. Project Manager and Principal Paleontologist and Archaeologist. 2009.

Scattergood Olympic Line. Archaeological and Paleontological Assessment and Mitigation Plan for new 11 mile underground electrical transmission line in Los Angeles. Project Manager and Principal Paleontologist and Archaeologist. 2008-9.

KIM SCOTT

Field & Lab Director for Paleontology

EDUCATION

2000 B.S., Geology with paleontology emphasis, University of California, Los Angeles

SUMMARY QUALIFICATIONS

Scott has more than 14 years of experience in California paleontology. She is a qualified geologist and field paleontologist with extensive survey, monitoring and fossil salvage experience. In addition, she has special skills in fossil preparation (cleaning and stabilization) and preparation of stratigraphic sections and other documentation for fossil localities. Scott serves as company safety officer and is the author of the company safety and paleontology manuals.

SELECTED PROJECTS

Tehachapi Renewable Transmission Project, Segments 1-3. Prepared portions of paleontological resources management plans, supervised paleontological monitoring, fossil recovery and preparation for construction of new electrical transmission facilities in Los Angeles and Kern Counties. Field and Lab Director. 2007-9

Tehachapi Renewable Transmission Project, Segments 4-11. Prepared portions of paleontological resources management plan for construction of new electrical transmission facilities in Los Angeles and Kern Counties. Field and Lab Director. 2007-9

El Casco Transmission Project. Conducted preconstruction mitigation measures and prepared portions of Paleontological Resources Treatment Plan for new SCE transmission project in Riverside County. Field and Lab Director. 2009

First Street Trunk Line Water Project. Prepared portions of paleontological assessment and supervised monitoring of installation of new water main in Los Angeles. Field and Lab Director. 2006-9

San Bernardino County Road Improvement Projects. Prepared portions of Paleontological Identification Reports, Paleontological Evaluation Reports and Paleontological Mitigation Plan for projects including I10, SR58, SR138, SR247. Supervised paleontological monitoring for SR138, recovered significant fossils and prepared Paleontological Mitigation Report. Field and Lab Director. 2005-present

SR178 Widening Project. Prepared portions of Paleontological Identification Report, Paleontological Evaluation Report and Paleontological Mitigation Plan for 8-mile segment east of Bakersfield. Field and Lab Director. 2007-9

Scattergood Olympic Line. Prepared portions of Paleontological Assessment for new 11-mile underground electrical transmission line in Los Angeles. Field and Lab Director. 2008-9

Niland Solar Energy Project. Prepared portions of Paleontological Assessment and conducted Mitigation Sampling for a 1000-acre solar project in Imperial County. Field and Lab Director. 2008-9

Rosedale (former Monrovia Nursery) Project. Supervised paleontological monitoring, conducted survey, and supervised fossil recovery for 500-acre mixed use development in Azusa. Field and Lab Director. 2004-7

Owens Valley PM10 Planning Area. Conducted paleontological surveys and assessments for two phases of evaluation of Dust Control Measures in Inyo County. Field and Lab Director. 2005-7

APPENDIX B: SBCM LITERATURE SEARCH

10 July 2008

Southern California Edison
attn: Koral Ahmet, M.A., RPA
2244 Walnut Grove Ave.
Rosemead, CA 91770-3714

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, PROPOSED ELDORADO - IVANPAH TRANSMISSION LINE, CALIFORNIA AND NEVADA**

Dear M. Ahmet,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a records search for the above-named project alignments. The following United States Geologic Survey 7.5' topographic quadrangle maps were examined to determine the potential for adverse impacts to paleontologic resources along the proposed Eldorado-Ivanpah Transmission Line alignments: Clark Mountain, CA (provisional edition 1985); Desert, NV (provisional edition 1985); Hidden Valley, NV (provisional edition 1985); Ivanpah Lake, CA-NV (provisional edition 1985); McCullough Pass, NV (provisional edition 1989); Mescal Range, CA (provisional edition 1983); Roach, NV (provisional edition 1985); and Sloan, NV (provisional edition 1989).

Based upon previous geologic mapping (Jennings, 1961; Longwell and others, 1965), a variety of geologic rock units are traversed by the proposed Eldorado-Ivanpah Transmission Line Project. These rock units are discussed below, in order from oldest to youngest. Sensitivity is presented as "low" or "high", depending upon the geologic formation or unit in question. "Low" paleontologic sensitivity corresponds to Class 1 of the Potential Fossil Yield Classification (PFYC) of the Bureau of Land Management (BLM). "High" paleontologic sensitivity herein corresponds to Class 5 of the PFYC.

GEOLOGY AND PALEONTOLOGY

Earlier Precambrian metamorphic rocks: Earlier Precambrian metamorphic rocks have been mapped (Jennings, 1961; Longwell and others, 1965) at the surface along the project corridor in the McCullough Range in Nevada and in the Clark Mountain vicinity in California. These exposures of gneiss and schist with intrusive metaigneous rocks have low potential to contain significant nonrenewable paleontologic resources, and so are assigned low paleontologic sensitivity.

Undivided Paleozoic marine rocks: Undivided Paleozoic marine rocks have been mapped

(Jennings, 1961) at the surface along the project corridor in the Clark Mountain vicinity, California. These rocks generally yield fossil remains of marine invertebrates. Fossils of this nature are abundant and widespread throughout the southern Nevada region, to such a degree that these fossils are not generally considered to have high paleontologic significance. Time-diagnostic invertebrates from these rocks have somewhat higher significance, but are still relatively common in the region. However, there is also the potential for caves to be present in such Paleozoic limestone rocks. A kind of cave termed a "solution cave" frequently forms in limestone rocks; percolation of acidic groundwater through the limestone dissolves the carbonate material and leaves behind fissures, caves or caverns. Not infrequently, caves that during earlier epochs opened to the surface accumulated significant fossil remains. For example, in mountainous regions carnivorous birds often roost near cave openings, and the remains of their meals as well as the skeletons of the birds themselves would fall into the cave. Since carnivorans also use caves for dens, their bones and the bones of their respective prey animals can also be preserved in caves. Wood rats also den in caves, and the middens created by such animals are uniquely informative paleontologic resources (see below). Finally, but less frequently, Pleistocene large mammals could be unfortunate enough to fall into such caves. These are just some of the ways in which caves in limestone rocks can become paleontological treasure troves. Similar caves elsewhere in the Mojave Desert have been previously reported to contain vertebrate fossil remains (Goodwin and Reynolds, 1986; Force, 1991; Reynolds and others, 1991a,b,c; Whistler, 1991; Scott, 1997; Scott and Cox, 2008). Should such cave deposits be encountered at depth anywhere along the proposed project alignments, they would be scientifically significant and so have high paleontologic sensitivity.

Tertiary volcanic rocks: Surface exposures of these rocks have been mapped (Longwell and others, 1965) along the project corridor in the McCullough Range in Nevada. Tertiary volcanic rocks in the Mojave Desert have low potential to contain significant fossil resources and are therefore assigned low paleontologic sensitivity.

Pleistocene older alluvium (undifferentiated): Pleistocene older alluvium has been mapped (Jennings, 1961) at the surface along the project corridor in the Clark Mountain vicinity, California. Older Pleistocene sediments throughout southern California (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991, Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999, 2007; Anderson and others, 2002) and the Mojave Desert (Jefferson, 1989, 1991; Reynolds, 1989; Scott, 1997; Scott and others, 1997; Scott and Cox, 2002, 2008) have been repeatedly demonstrated to be highly fossiliferous. Where present at the surface or at depth along the alignments of the proposed Eldorado-Ivanpah Transmission Line, these sediments would have high potential to contain significant nonrenewable paleontologic resources, and so would be assigned high paleontologic sensitivity.

Holocene alluvium: Holocene alluvium has been mapped (Jennings, 1961; Longwell and others, 1965) at the surface along the length of the project corridor in California and Nevada. Many of the above-described geologic formations are overlain intermittently by Quaternary (Pleistocene or Recent) alluvium. Depending upon the age at which this alluvium was laid down, which cannot be determined with any precision *a priori*, this lithologic unit may also have high paleontologic

sensitivity. Near the northern end of Ivanpah Lake, for example, large mammal bone fragments were recovered from sediments mapped (Longwell and others, 1965) as Quaternary alluvium identical to that along portions of the proposed alignments. Similarly, surface exposures of Quaternary alluvium near Glendale, Nevada yielded mammal fossils including a tooth of extinct horse (*Equus* sp.).

REVIEW OF THE RPLI

For this review, Craig R. Manker of the Division of Geological Sciences, SBCM conducted a search of the Regional Paleontologic Locality Inventory (RPLI). The results of this search indicate that several paleontologic resource localities are recorded within one mile of the Proposed Eldorado-Ivanpah Transmission Line alignments. The nearest paleontologic resource locality (SBCM 1.2.5) is located on the California-Nevada border approximately 300 feet northwest of the main alignment. This locality yielded indeterminate large mammal bone fragments from sediments mapped (Longwell and others, 1965) as Quaternary alluvium.

Additionally, localities (SBCM 1.2.1 through 1.2.4) located in sections 35 and 36 (T17N, R14E) have produced fossil remains of tortoise (*Gopherus* sp.), kangaroo rat (*Dipodomys* sp.), wood rat (*Neotoma* sp.), and other small vertebrates, as well as a partial hackberry seed (*Celtis* sp.) and clasts of tufa from the high stand of Ivanpah Lake. Fossil hackberry seeds are abundant in nearby cave deposits which contain Pleistocene vertebrate faunas (Reynolds and others, 1991). Tufa is common at the top of the sedimentary section at several Pleistocene lakes in San Bernardino County, including Piute Valley, and Cadiz. However, it is important to note that none of the localities near Ivanpah Lake has yielded temporally diagnostic fossil remains. For this reason, a Pleistocene age for these faunas can be suggested, but not demonstrated.

CONCLUSIONS

The results of the literature review and the search of the RPLI at the SBCM demonstrate that the proposed Eldorado-Ivanpah Transmission Line alignments traverse a variety of fossiliferous geologic units with potential to contain paleontologic resources. Excavation in conjunction with development of the project will require a qualified vertebrate paleontologist to develop a program to mitigate impacts to significant nonrenewable paleontologic resources, including full curation of recovered significant resources (see Scott and others, 2004). Such a mitigation program must be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the Counties of Clark, Nevada and San Bernardino, California, and the proposed guidelines of the Society of Vertebrate Paleontology.

The County of San Bernardino (Development Code §82.20.040) defines a qualified vertebrate paleontologist as meeting the following criteria:

Education: An advanced degree (Masters or higher) in geology, paleontology, biology or related disciplines (exclusive of archaeology).

Professional experience: At least five years professional experience with paleontologic (not including cultural) resources, including the collection, identification and curation of the resources.

The County of San Bernardino (Development Code §82.20.030) requires that paleontologic mitigation programs include, but not be limited to:

(a) Field survey before grading. In areas of potential but unknown sensitivity, field surveys before grading shall be required to establish the need for paleontologic monitoring.

(b) Monitoring during grading. A project that requires grading plans and is located in an area of known fossil occurrence, or that has been demonstrated to have fossils present in a field survey, shall have all grading monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Paleontologic monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring is not necessary if the potentially-fossiliferous units described for the property in question are not present, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.

(c) Recovered specimens. Qualified paleontologic personnel shall prepare recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils is essential in order to fully mitigate adverse impacts to the resources.

(d) Identification and curation of specimens. Qualified paleontologic personnel shall identify and curate specimens into the collections of the Division of Geological Sciences, San Bernardino County Museum, an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation and CEQA compliance. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until curation into an established museum repository has been fully completed and documented.

(e) Report of findings. Qualified paleontologic personnel shall prepare a report of findings with an appended itemized of specimens. A preliminary report shall be submitted and approved before granting of building permits, and a final report shall be submitted and approved before granting of occupancy permits. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into the collections of the San Bernardino County Museum, will signify completion of the program to mitigate impacts to paleontologic resources.

Based upon these requirements, and considering that the Proposed Eldorado-Ivanpah Transmission Line Project crosses two states, we recommend that the mitigation program should include, but not be limited to, the following treatment measures [Paleontology Actions (PA)]:

PA-1: Prior to construction, completion of a paleontologic resource assessment program including a review of the pertinent paleontologic and geologic literature, a check of pertinent locality records, and field reconnaissance along the proposed transmission line alignment, including visual examination of all associated areas of potential effect (stations, access roads, etc.). This assessment will identify exposed paleontologic resources and confirm determinations of paleontologic sensitivity along the proposed alignment.

PA-2: Prior to construction, preparation of a Paleontologic Resources Treatment Plan, to be approved by the appropriate Lead Agencies, that addresses the treatment of paleontologic resources discovered during construction. This Plan, prepared by a qualified paleontologist, will include procedures for significance testing and data recovery.

PA-3: Prior to construction, preparation and presentation of orientation workshops to explain paleontologic mitigation guidelines and procedures to construction personnel and other environmental monitors.

PA-4: Pre-construction field recovery of all exposed paleontologic resources and associated contextual data identified during the field reconnaissance portion of the assessment. This recovery will be conducted by qualified professional vertebrate paleontologists with regional experience, under appropriate permits where necessary, to recover exposed fossils and associated contextual data identified during the field survey.

PA-5: Full-time monitoring in rock units having high paleontologic sensitivity and spot-check paleontologic monitoring in rock units determined to have undetermined paleontologic sensitivity. Monitoring to be conducted by qualified professional vertebrate paleontologists with regional experience, under authority of pertinent collecting permits. Salvage will include recovery of exposed significant paleontologic resources and sampling where necessary to recover microfossil remains.

PA-6: Preparation of recovered paleontologic resources to a point of identification and permanent preservation, including stabilization of large remains and screen washing of fossiliferous sediments to recover significant microfossil remains.

PA-7: Analysis of recovered fossils, including (but not limited to): identification of the recovered fossils; interpretations of species abundance and diversity; determinations of sex ratios and the relative abundance of ontogenetic age groups; dating of remains as appropriate; evaluation of potential taphonomic factors; and comparison with other vertebrate faunas from the Mojave Desert and the southwestern United States.

PA-8: Preservation and curation of recovered significant fossil resources, including all associated contextual data, at a Federally recognized, accredited repository with long-term retrievable storage (e.g., SBCM). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such full curation into an established museum repository has been fully completed and documented.

PA-9: Preparation of a final report, including an itemized and accessioned inventory of recovered specimens, to be prepared by a professional vertebrate paleontologist and distributed to the appropriate lead agencies. This report shall include documentation of any and all significant fossil vertebrate localities and/or fossil plant localities. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontologic resources.

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Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

APPENDIX C: SURVEY LOCALITY SHEET

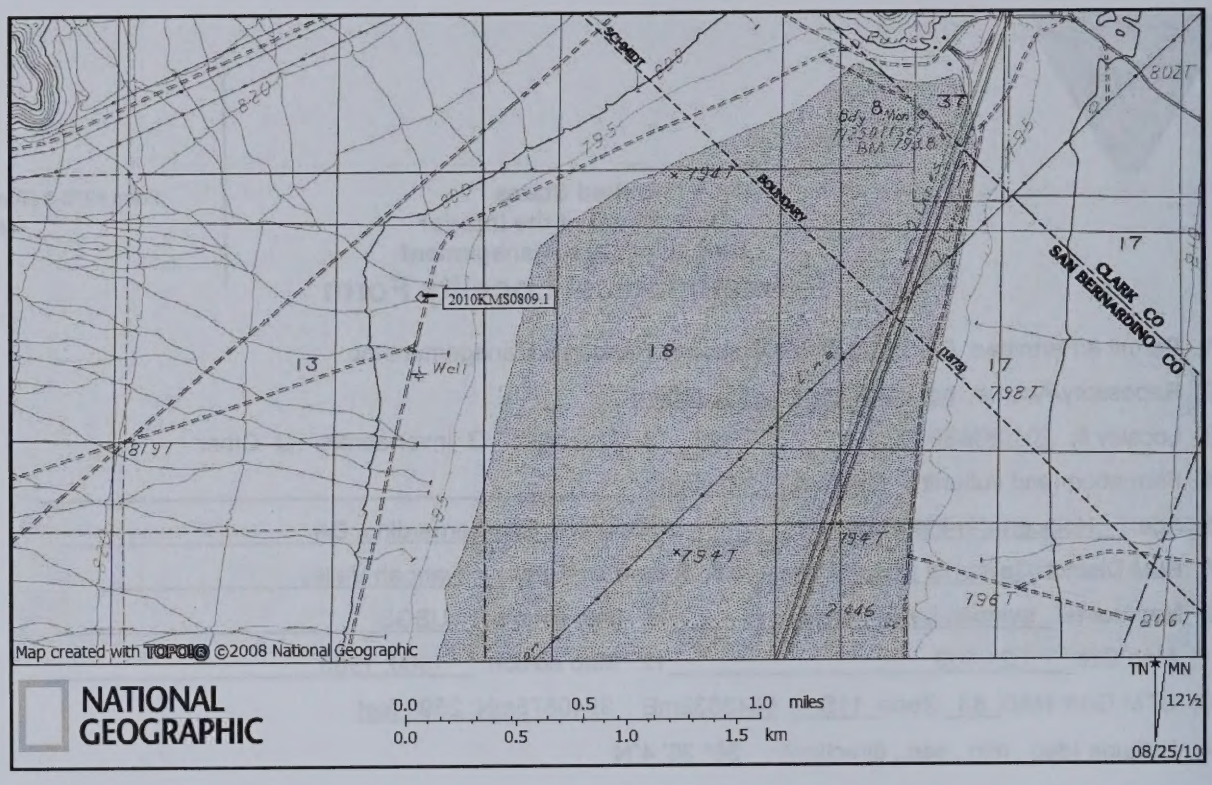
Form 8270-3 (Temporary)
May 1994

United States
Department of the Interior
Bureau of Land Management

Paleontological Locality Form

1. Permit #/Permittee: CA-10-00-004P/ Cogstone Resource Management Inc.
2. Repository/Accn.#: not collected – survey record
3. Locality #: 2010KMS0809.1 ☑ Plant ☐ Vertebrate ☐ Invertebrate ☐ Other
4. Formation (and subunit): Quaternary alluvium
5. Age: Holocene(?)-Pleistocene(?) 6. County: San Bernardino, CA
7. BLM District: California Desert District 8. Resource Area: Ivanpah Valley
9. Map name: Ivanpah Lake, CA, NV 10. Map source: USGS
11. Map size: 1:24,000 12. Map edition: 1980, 1985
13. UTM Grid: NAD 83 Zone 11S 0643332mE 3940875mN; 2599 feet
14. Latitude (deg., min., sec., direction): 36° 36' 4"N
    Longitude (deg., min., sec., direction): 115° 25' 4"W
15. Survey (Sec., T & R): sec 13, T7S, R14
16. Taxa Collected/observed: carbonized plant remains observed

17. Collector: Kim Scott 18. Date: Aug 9, 2010
19. Remarks: Survey only so left material *in situ*. Road has been realigned from topo (next page) so locality is on the south side of the road in a gully, 1 meter below current surface.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APPENDIX D: COMMUNICATION CONTACT LIST

Name	Position	Cell	Office	email
Sherri Gust	Principal Paleontologist, Cogstone	714-743-9207	714-974-8300	sgust@cogstone.com
Kim Scott	Paleontology Field & Lab Director, Cogstone	951-415-1388	714-974-8300	kscott@cogstone.com
Kimberly Cuevas	SCE Project Archaeologist		(626) 302-3939	Kimberly.Cuevas@sce.com
Susanne J. Rowe	Archaeologist Bureau of Land Management Las Vegas, NV Field Office		(702) 515-5067	Susanne_Rowe@blm.gov
Sarah Murray	Archaeologist Bureau of Land Management Needles, CA Field Office		760-326-7009	Sarah_C_Murray@blm.gov

APPENDIX E: BLM REQUIREMENTS

BLM Library
Denver Federal Center
Bldg. 65, OC-521
P.O. Box 25047
Denver, CO 80225

15. Standard Permit Conditions

a. This permit is subject to all applicable provisions of 43 CFR Part 3, 43 CFR 7, and 25 CFR 262, and applicable departmental and bureau policies and procedures, which are made a part hereof.

b. The permittee and this permit are subject to all other Federal, State, and local laws and regulations applicable to the public lands and resources.

c. This permit shall not be exclusive in character, and shall not affect the ability of the land managing bureau to use, lease or permit the use of lands subject to this permit for any purpose.

d. This permit may not be assigned.

e. This permit may be suspended or terminated for breach of any condition or for management purposes at the discretion of the approving official, upon written notice.

f. This permit is issued for the term specified in 11 above.

g. Permits issued for a duration of more than one year must be reviewed annually by the agency official and the permittee.

h. The permittee shall obtain all other required permit(s) to conduct the specified project.

i. Archeological project design, literature review, development of the regional historic context framework, site evaluation, and recommendations for subsequent investigations must be developed with direct involvement of an archeologist who meets the Secretary of the Interior's Standards for Archeology and Historic Preservation; fieldwork must be generally overseen by an individual who meets the Secretary of the Interior's Standards for Archeology and Historic Preservation.

j. Permittee shall immediately request that the approving official (14. above) make a modification to accommodate any change in an essential condition of the permit, including individuals named and the nature, location, purpose, and time of authorized work, and shall without delay notify the approving official of any other changes affecting the permit or regarding information submitted as part of the application for the permit. Failure to do so may result in permit suspension or revocation.

k. Permittee may request permit extension, in writing, at any time prior to expiration of the term of the permit, specifying a limited, definite amount of time required to complete permitted work.

l. Any correspondence about this permit or work conducted under its authority must cite the permit number. Any publication of results of work conducted under the authority of this permit must cite the approving bureau and the permit number.

m. Permittee shall submit a copy of any published journal article and any published or unpublished report, paper, and manuscript resulting from the permitted work (apart from those required in items q. and s., below), to the approving official and the appropriate official of the approved curatorial facility (item 12 above).

n. Prior to beginning any fieldwork under the authority of this permit, the permittee, following the affected bureau's policies and procedures, shall contact the field office manager responsible for administering the lands involved to obtain further instructions.

o. Permittee may request a review, in writing to the official concerned, of any disputed decision regarding inclusion of specific terms and conditions or the modification, suspension, or revocation of this permit, setting out reasons for believing that the decision should be reconsidered.

p. Permittee shall not be released from requirements of this permit until all outstanding obligations have been satisfied, whether or not the term of the permit has expired. Permittee may be subject to civil penalties for violation of any term or condition of this permit.

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

15. Standard Permit Conditions (continued)

q. Permittee shall submit a preliminary report to the approving official within a timeframe established by the approving official, which shall be no later than 6 weeks after the completion of any episode of fieldwork, setting out what was done, how it was done, by whom, specifically where, and with what results, including maps, GPS data, an approved site form for each newly recorded archeological site, and the permittee's professional recommendations, as results require. If other than 6 weeks, the timeframe shall be specified in Special Permit Condition p. Depending on the scope, duration, and nature of the work, the approving official may require progress reports, during or after the fieldwork period or both, and as specified in Special Permit Condition r.

r. Permittee shall submit a clean, edited draft final report to the agency official for review to insure conformance with standards, guidelines, regulations, and all stipulations of the permit. The schedule for submitting the draft shall be determined by the agency official.

s. Permittee shall submit a final report to the approving official not later than 180 days after completion of fieldwork. Where a fieldwork episode involved only minor work and/or minor findings, a final report may be submitted in place of the preliminary report. If the size or nature of fieldwork merits, the approving official may authorize a longer timeframe for the submission of the final report as specified in Special Permit Condition q.

t. Two copies of the final report, a completed NTIS Report Documentation Page (SF-298), available at http://www.ntis.gov/pdf/rdpform.pdf, and a completed NADB-Reports Citation Form, available at http://www.cr.nps.gov/aad/tools/nadbform_update.doc, will be submitted to the office issuing the permit.

u. The permittee agrees to keep the specific location of sensitive resources confidential. Sensitive resources include threatened species, endangered species, and rare species, archeological sites, caves, fossil sites, minerals, commercially valuable resources, and sacred ceremonial sites.

v. Permittee shall deposit all artifacts, samples and collections, as applicable, and original or clear copies of all records, data, photographs, and other documents, resulting from work conducted under this permit, with the curatorial facility named in item 12, above, not later than 90 days after the date the final report is submitted to the approving official. Not later than 180 days after the final report is submitted, permittee shall provide the approving official with a catalog and evaluation of all materials deposited with the curatorial facility, including the facility's accession and/or catalog numbers.

w. Permittee shall provide the approving official with a confirmation that museum collections described in v. above were deposited with the approved curatorial facility, signed by an authorized curatorial facility official, stating the date materials were deposited, and the type, number and condition of the collected museum objects deposited at the facility.

x. Permittee shall not publish, without the approving official's prior permission, any locational or other identifying archeological site information that could compromise the Government's protection and management of archeological sites.

y. For excavations, permittee shall consult the OSHA excavation standards which are contained in 29 CFR §1926.650, §1926.651 and §1926.652. For questions regarding these standards contact the local area OSHA office, OSHA at 1-800-321-OSHA, or the OSHA website at http://www.osha.gov.

z. Special permit conditions attached to this permit are made a part hereof.

16. Special Permit Conditions

- ☒ a. Permittee shall allow the approving official and bureau field officials, or their representatives, full access to the work area specified in this permit at any time the permittee is in the field, for purposes of examining the work area and any recovered materials and related records.
- ☒ b. Permittee shall cease work upon discovering any human remains and shall immediately notify the approving official or bureau field official. Work in the vicinity of the discovery may not resume until the authorized official has given permission.
- ☒ c. Permittee shall backfill all subsurface test exposures and excavation units as soon as possible after recording the results, and shall restore them as closely as reasonable to the original contour.
- ☒ d. Permittee shall not use mechanized equipment in designated, proposed, or potential wilderness areas unless authorized by the agency official or a designee in additional specific conditions associated with this permit.
- ☒ e. Permittee shall take precautions to protect livestock, wildlife, the public, or other users of the public lands from accidental injury in any excavation unit.
- ☒ f. Permittee shall not conduct any flint knapping or lithic replication experiments at any archeological site, aboriginal quarry source, or non-site location that might be mistaken for an archeological site as a result of such experiments.
- ☒ g. Permittee shall perform the fieldwork authorized in this permit in a way that does not impede or interfere with other legitimate uses of the public lands, except when the authorized officer specifically provides otherwise.
- ☒ h. Permittee shall restrict vehicular activity to existing roads and trails unless the authorized officer provides otherwise.
- ☒ i. Permittee shall keep disturbance to the minimum area consistent with the nature and purpose of the fieldwork.
- ☒ j. Permittee shall not cut or otherwise damage living trees unless the authorized officer gives permission.
- ☒ k. Permittee shall take precautions at all times to prevent wildfire. Permittee shall be held responsible for suppression costs for any fires on public lands caused by the permittee's negligence. Permittee may not burn debris without the authorized officer's specific permission.
- ☒ l. Permittee shall conduct all operations in such a manner as to prevent or minimize scarring and erosion of the land, pollution of the water resources, and damage to the watershed.
- ☒ m. Permittee shall not disturb resource management facilities within the permit area, such as fences, reservoirs, and other improvements, without the authorized officer's approval. Where disturbance is necessary, permittee shall return the facility to its prior condition, as determined by the authorized officer.
- ☒ n. Permittee shall remove temporary stakes and/or flagging, which the permittee has installed, upon completion of fieldwork.
- ☒ o. Permittee shall clean all camp and work areas before leaving the permit area. Permittee shall take precautions to prevent littering or pollution on public lands, waterways, and adjoining properties. Refuse shall be carried out and deposited in approved disposal areas.
- ☐ p. Permittee shall submit the preliminary report within _____ days/weeks of completion of any episode of fieldwork..
- ☐ q. Permittee shall submit the final report within _____ days/weeks/months after completion of fieldwork..
- ☐ r. Permittee shall submit progress reports every _____ months over the duration of the project.
- ☒ s. California special permit conditions are attached.

Special Permit Conditions Continuation Sheet: California Conditions

- a. Work under this permit is limited to specific service approved for each permit. This may consist of non-collection survey, limited testing to determine site content and limits or extensive testing emergency excavation and/or salvage projects. Testing/ excavation projects may be conducted under the authority of this permit only upon completion of ARPA consultation with Native American Groups and written approval from the Bureau for such work. (CARIDAPs for the purpose of the identification of archaeological resources are authorized under a FLPMA/ARPA Permit).
- b. Permittees shall verbally and subsequently in writing contact the appropriate BLM Field Manager prior to the beginning of each of his field operations (with follow-up written notification) to inform the BLM of specific work to be conducted. At this time, the BLM Field Manager may impose additional stipulation as deemed necessary to provide for the protection and management of resource values in the general site or project area.
- c. All cultural artifacts and other related materials such as notes, photographs, etc., acquired under the provisions of this permit remain the property of the United States Government and may be recalled at any time for the use of the Department of the interior or other agencies of the Federal Government. Cultural materials collected under the provisions of this permit must be curated at a repository approved by the BLM. Curation shall be at a local qualified repository, if feasible, and an approved curation facility shall be designated prior to all field projects. An itemized list of all materials with accession numbers, curated at the repository will be submitted to the State Office and to the appropriate Field Office within 180 days of the completion of individual field projects. A copy of a receipt from the curation facility must be submitted with the list or catalogue.
- d. Permittees shall acquire a primary number from the appropriate Information Center for each cultural resource documented while undertaking work authorized by this permit.
- e. The BLM Field Manager or authorized representative may require a monthly letter progress report outlining what was accomplished. This report, if required, is due by the fifth day of the following month, unless different arrangements are approved.
- f. The individual(s) in direct charge must be academically qualified and possess adequate field experience. At least two weeks prior to initiation field work, the permittees must provide the BLM Field Manager with the vitae of individuals proposed to be in direct charge if not approved at the time of permit issuance. A list of field crew members should be submitted at the same time. Only the individual(s) listed in Item No. 8 of the permit is/are authorized to be in direct charge of field work conducted under this permit.
- g. The person(s) in direct charge of field work, shall be on site at all times when work is in progress. Failure to comply with permit stipulations will result in removal of subject's name(s) from the approved list of person-in-direct-charge.
- h. Care should be exercised to avoid directly or indirectly increasing access or potential vandalism to sensitive sites.
- i. All National Permit Stipulations are binding. The authority for issuing permits in the Bureau of Land Management rests solely with the State Director as Delegated by the Secretary of the Interior and all further delegation is prohibited by Secretarial Order. No Modification of National Permit Conditions 8 or 9 or of the California Special Permit Conditions may occur except by written decision of the State Director.
- j. The Bureau of Land Management shall be cited in any report of work done under this permit, including publications such as books, news articles and scientific publications, as well as oral reports, films, television programs, and presentations in other media.

Supplemental Reporting Guidelines - Cultural Resources Program - Paleontology

In addition to the normal reporting information, BLM requires that you provide the Needles Field Office the following summary statistics about this project as an addition/supplement to the executive summary or abstract of your report. BLM is required to compile these statistics on an annual basis as part of our responsibilities. You may follow whatever format best serves your needs. There is no standard form. You may include the information in narrative form, or you may use the attached data sheet or create your own version. An electronic version of this form is available upon request.

A. The following information shall be included in or supplement the Executive Summary of your project or survey report.

1. Project Name
2. Your BLM State Permit Number
3. Your Field Authorization Number
4. Dates of Field Survey

5. Total acreage of all lands field surveyed for paleontological resources.

    Of Item 5 above:

        a) Acreage of BLM lands surveyed.

        b) Acreage of other lands surveyed (Private, State, Other Federal).

6. Total number of paleontological localities in project Area of Potential Effect.

    Of Item 6 above:

        a) Total number of localities for which records were completed (newly recorded localities).

        b) Number of new localities on BLM Lands.

        c) Number of new localities on other lands (Private, State, Other Federal).

7. Of the localities located within the Area of Potential Effect:

        a) Number of localities that you are recommending as scientifically significant.

        b) Number of localities that you are recommending as not scientifically significant.

    Of Item 7a above:

        i) Number of localities that can/will be avoided.

        ii) Number of localities that will be affected.

        iii) Number of localities that you are recommending data recovery/mitigation.

Of Item 7b above:

i) Number of localities that can/will be avoided.

ii) Number of localities that will be affected.

B. Geographic Information system (GIS) data layers (shape files) shall be submitted for the project area (indicating area of pedestrian survey) and all identified sites (both newly recorded and previously identified). These data may be submitted on compact disk at the time the draft survey report is submitted.

C. Copies of locality forms for all discoveries within the project area shall be appended to the survey report in a confidential appendix (both newly recorded and previously identified). Electronic copies of all locality records shall also be submitted.

Form UT-8270-? (Draft)
August 2008

United States
Department of the Interior
Bureau of Land Management
Utah State Office

BLM-UT Paleontology Consulting Report Cover Sheet

Permit Number:	
Name of Permittee (Principle Investigator):	
Affiliation of Permittee (Principle Investigator):	
Date of Report:	
Date(s) of Field Work:	TO
Report Code/Number:	Leave blank if there is no report number
Title of Report:	Enter the full title of the report
Operator/Proponent:	
Project Name/Well Pad(s):	Enter project name or well pad(s) sites here
Township, Range, and Section (T-R-S):	Example: T9S-R22E-S24 NW,SW; T10S-R23E-S23 NW,SW
County:	Enter county/counties
Topographic Map(s) related to project area(s):	Enter name of USGS 7.5 minute topo map(s)
BLM Office/ Administrative Area Associated w/ Project Area(s):	Selected an Office/Area from the list below
Summary of Fossil Resource(s) Discovered:	Please include locality number(s)
Name of Repository listed on permit:	
Individuals Working as Field Crew:	Names of all individuals who worked on this project
Total Number of Work Hours on Site:	

Signature of Permittee (Principle Investigator) Date

BLM HANDBOOK H-8270-1 - GENERAL PROCEDURAL GUIDANCE
FOR PALEONTOLOGICAL RESOURCE MANAGEMENT

United States
Department of the Interior
Bureau of Land Management

Form 8270-3 (Temporary)
May 1994

Paleontological Locality Form

1. Permit #/Permittee:
2. Repository/Accn.#:
3. Locality #: _____ ❑ Plant ❑ Vertebrate ❑ Invertebrate ❑ Other
4. Formation (and subunit): _____
5. Age: _____ 6. County: _____
7. BLM District: _____ 8. Resource Area: _____
9. Map name: _____ 10. Map source: _____
11. Map size: _____ 12. Map edition: _____
13. UTM Grid: NAD____ Zone_____ _____ m E _____ m N
14. Latitude (deg., min., sec., direction): _____
    Longitude (deg., min., sec., direction): _____
15. Survey (Sec., T & R): _____
16. Taxa Collected/observed: _____
    _____
17. Collector: _____ 18. Date: _____
19. Remarks: _____
    _____
    _____
    _____
    _____
    _____
    _____

BLM MANUAL

Rel. 8-69
07/13/98
07/24/06 revision_SF

Bureau of Land Management

California State Office

2800 Cottage Way W-1623
Sacramento, CA 95825
http://www.blm.gov

BLM Verification of Collections (completed by BLM)	
BLM Official:	
Date Received:	

REPOSITORY RECEIPT FOR COLLECTIONS

Artifacts and specimens recovered from BLM-administered lands are Federal property, and must be managed in a manner consistent with Federal stewardship responsibilities for museum collections. Cultural or paleontological resource permits for collecting activities require that the permittee arrange for curation of artifacts and specimens in an appropriate repository. Collections must be deposited in a repository for curation within one year of completion of the permitted project, unless alternate arrangements have been approved by the BLM permitting official.

This Deposition of Museum Collections Confirmation and Inventory form is required as a condition of the permit and must be completed for all museum collections originating from BLM administered lands, with the associated documentation, to ensure collections are deposited in an appropriate curatorial facility. A receiving document generated by the repository may be substituted if it contains the same information as this form.

Instructions

1. All information requested on this form must be completed by the permittee and repository officials.
2. Permittees must provide an itemized inventory of the objects, lots, samples, and associated documentation to be deposited attached to this statement. The inventory must include site or locality designation, number of units per material type according to BLM and the repository standards. A complete collection includes:
   - All artifacts, specimens, and environmental materials collected with provenience data
   - All survey or excavation records and logs
   - All maps showing locations and boundaries
   - All valid photographs, negatives, and slides
   - All analysis records, and copies of all reports and publications
3. A repository official must acknowledge receipt of the collection. Before signing, the repository official should compare the inventory to the actual objects and records being deposited.
4. If the permittee and the Repository Official are the same individual, an additional Repository Official must be signatory to this form.
5. After this form has been signed by the repository official, the original form with the collection inventory must be submitted the BLM State Archaeologist by the permittee.
6. Upon submission to BLM, the BLM official may contact the repository to verify the inventory of collections deposited by the permittee.

Permittee Information

Permit Number: _____ Project Name and Number: _____

Permittee Name: _____

Address: _____

City, State Zip Code:

Telephone Number:

Certification of Collection Deposition in Repository by Permittee

I, _____(Permittee) certify that _____(name of repository) has on this date, _____, accepted the collections of objects, lots, samples, and associated documentation described on the attached inventory.

Signature: _____ Date: _____

Complete or Partial Deposit (check one)

_____ I certify that the inventory represents all materials and associated documentation from the work performed under this permit (complete deposit).

_____ I certify that this represents a portion of the materials and associated documentation. The attached sheet lists what materials are not yet deposited, the reason they are not deposited at this time and when they are expected to be deposited (partial deposit).

Curation Facility Information

Repository Name: _____

Address: _____

City, State Zip Code: _____

Telephone Number: _____

Official Authorizing Receipt (name and title): _____

Accession Number Assigned by the Repository: _____

Receipt of Collection Statement by Repository Official

I, _____(Repository Official) certify that the _____(name of facility) has on this date,_____, accepted the collections of objects, lots, samples, and associated documentation described on the attached inventory from _____(permittee).

Signature: _____ Date: _____

Bureau of Land Management
COLLECTION INVENTORY FORM

Permit Number: _____
Repository Name: _____
Repository Accession Number: _____

Discipline: _____ Archaeology
(check one) _____ Paleontology

Site or Locality Number	Catalog Numbers or Field Specimen Numbers	Material Type	Quantity	Unit Type object, bag, cubic feet, linear feet, other (specify)	Comments
		TOTAL ITEMS:		Objects Bags (lot) Cubic Feet (lot) Linear Feet (archival lot)	

APPENDIX F: REPOSITORY AGREEMENT

SAN BERNARDINO COUNTY MUSEUM

2024 Orange Tree Lane • Redlands, California USA 92374-4560
(909) 307-2669 • Fax (909) 307-0539 • www.sbcountymuseum.org
TDD (909) 792-1462

COUNTY OF SAN BERNARDINO

ROBERT L. McKERNAN
Director

12 July 2010

Sherri Gust
Cogstone
Paleontology Archaeology History
1518 W Taft Ave, Orange, CA 92865-4157

Dear Ms. Gust:

The San Bernardino County Museum (SBCM) is a professional, permanent repository for paleontologic resources collected from private and Federal lands, and is accredited by the American Association of Museums. Additionally, the SBCM upholds professional museum standards and has been recognized by the Federal Government as DM411compliant as set forth by the Department of the Interior's Departmental Manual. Our institution will accept and professionally curate paleontologic collections and accompanying samples, records, data, maps, photographs, field notes, and other documents derived from paleontologic work conducted by Cogstone, under the direction of Ms. Sherri Gust as the Principal Investigator. This repository letter is written specifically for the proposed Eldorado-Ivanpah 500kV transmission line project. The project extends from the Eldorado substation near Boulder City, NV, traversing areas administered by the Las Vegas Field Office of the BLM, terminating in California at the Ivanpah substation on public lands administered by the Needles Field office of the BLM.

The SBCM further agrees to assume permanent curatorial responsibility for such materials owned by and on behalf of the Federal government (Bureau of Land Management). Curation costs and storage fees will be borne by the project proponent and will require a curation contract between Cogstone and the SBCM at that time.

Sincerely,

Kathleen Springer, Senior Curator
Division of Geological Sciences
San Bernardino County Museum
kspringer@sbcm.sbcounty.gov

Eldorado-Ivanpah Transmission Project

Accident Prevention Manual

ACCIDENT PREVENTION MANUAL

SOUTHERN CALIFORNIA EDISON®

An *EDISON INTERNATIONAL*® Company

SOUTHERN CALIFORNIA EDISON®
An *EDISON INTERNATIONAL®* Company

Cecil R. House
Senior Vice President of Safety,
Operations Support and
Chief Procurement Officer

December 2010

Dear New SCE Employee,

Welcome to SCE. As a new employee, I want you to know that safety is our number one company operating priority. Our goal is to have an injury-free workplace. We have developed a comprehensive Environment, Health, and Safety (EH&S) management system that contains policies, programs, and other initiatives to help us achieve this goal.

The SCE Safety Program is represented by our Injury and Illness Prevention Program. Enclosed with this letter is a copy of the SCE Accident Prevention Manual (APM), which is a key element of our 'Injury and Illness Prevention Plan'.

This APM contains policies and safety rules for common work activities. Please read this manual and familiarize yourself with these policies and applicable safety rules. Speak with your manager or supervisor about how these rules and policies relate to your job. If you are stationed in an office, pay particular attention to the Policy Section (P Series). Rules and policies are only part of a strong safety program. We must also focus on our culture our attitudes and beliefs about how we approach our work.

You are expected to:

- Only perform work that you have been trained to do.
- Stop the job if you are not sure on how to perform it safely.
- Ask for help when you have questions.
- Watch out for each other.
- Report incidents and injuries promptly so that proper medical care can be provided in a timely manner and we learn from our mistakes.

Working safely requires each of us to make personal commitments to ourselves, our families and our colleagues. To achieve an injury-free workplace, we all must consistently dedicate ourselves to working safely.

I look forward to working with you on this important effort.

Sincerely,

Cecil R. House
Senior Vice President of Safety,
Operations Support and Chief Procurement Officer

P.O. Box 976
2244 Walnut Grove Ave.
Rosemead, CA 91770
(626) 302-2355

Accident Prevention Manual (APM) — Instructions

- The current version of the Accident Prevention Manual is available through Corporate Environmental Health & Safety Portal. If an employee has regular access to a computer and does not wish to have a hard copy of the manual, they can use this method as an alternate way to read and review accident prevention rules.

- Please sign the acknowledgement page and give it to your Payroll support representative for placement in your personnel file. *Do not send a signed acknowledgement page to the Corporate Safety Department.*

- Instructions for ordering additional APMs are on the Corporate Environmental Health and Safety page of the Edison Portal.

- A current version of the APM is available on Corporate Environment, Health and Safety page of the Edison Portal.

- For questions regarding the revisions or other questions about the APM, please contact Larry Pena, Manager of Corporate Safety Policy and Regulations, PAX 54612 or penaln@sce.com.

Edison International Safety Commitment Statement

Our Commitment to Safety

We are committed to strengthening our safety culture to achieve an injury-free workplace by creating and sustaining a work environment that values:

- Having every employee leave the workplace unhurt;
- Using work behaviors and practices that uncompromisingly protect the safety of everyone;
- Caring for the safety of each other; and
- Stopping work anytime unsafe conditions or behaviors are observed until the job can be completed safely.

A continuous commitment and dedication to following these values by all of us will assure that the safest workplace is established and that the Safest work behaviors are always used to prevent injuries.

EDISON INTERNATIONAL®

Our Commitment to Safety

We are committed to strengthening our safety culture to achieve an injury-free workplace by creating and sustaining a work environment that values:

- Having every employee leave the workplace unhurt;
- Doing work behaviors and practices that uncompromisingly protect the safety of everyone;
- Caring for the safety of each other; and
- Stopping work anytime unsafe conditions or behaviors are observed until the job can be completed safely.

A continuous commitment and dedication to following these values by all of us will assure that the safest workplace is established and that the safest work behaviors are always used to prevent injuries.

Southern California Edison Company

ACCIDENT PREVENTION MANUAL

I hereby acknowledge receipt and possession of a copy of the Southern California Edison Company, **December 2010** Accident Prevention Manual Revision Package.

I agree to comply with the rules contained in the manual which are applicable to the work I perform. I understand that failure to comply with these safety rules will be sufficient cause for disciplinary action.

Signed _____

Print Name _____

Date Received _____

Revisions Delivered By _____

Original to be filed in Payroll Location Personnel File

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POLICY SECTION

P-1. Scope

a. It is the policy of the Company that all rules and policies contained in this manual shall be complied with by every employee of the Company under every circumstance where they are applicable, and shall be effective as of the date of issuance.

b. When an employee of one Company organization is assigned to work on equipment or facilities under the jurisdiction of another, such employee shall follow the rules of the latter. Such employee shall report to the designated supervisor of the organization in which the employee is going to work to determine the hazards that may be encountered in that particular department or division.

c. Each site shall develop and maintain a site-specific Injury and Illness Prevention Program (IIPP) Implementation Plan. Corporate EH&S has developed guidance for implementing the requirements of this program. Information regarding the IIPP Program including templates can be found on the Corporate Environmental Health & Safety Portal.

P-2. Enforcement

a. The Manager of Corporate Safety Policy and Regulation shall be the administrator of the SCE injury and illness prevention program.

b. It shall be the responsibility of the appropriate site manager to implement and maintain the corporate injury and illness prevention programs in each work location under their area of responsibility.

c. Employees acting in a supervisory capacity, either regularly or temporarily, shall require all employees working under their jurisdiction to comply with all applicable policy safety rules and safety work practices.

d. Noncompliance by any employee constitutes a violation of corporate policy and subjects the employee to disciplinary action including, but not limited to written reprimand, suspension, or termination.

P-3. Investigations

All industrial injuries and illnesses shall be investigated in accordance with established Corporate policies.

P-4. Knowledge

Each employee of the Company shall be provided access to this manual and shall be required to know and understand those sections which apply to the work being performed. Employees shall be subject at any time to an examination on the contents which apply to their duties.

P-5. Education

a. It shall be the responsibility of each supervisor to ensure that all new employees and all employees given new job assignments for which they have not previously been trained, be provided with training and instruction on hazards unique to their job.

b. In addition to any current safety, accident prevention, educational, or training program, each supervisor shall make certain that all employees under his/her jurisdiction are instructed and advised concerning applicable rules and their application.

P-6. Emergencies

In case of an emergency which may result in a serious personal injury, a supervisor, or employee in charge, may temporarily modify or suspend any of these rules as may be considered necessary to permit proper handling of the specific emergency. In any such case, the person so acting shall be fully accountable for the reasonableness of these actions and for any accident or service interruption resulting therefrom.

P-7. Interpretation

These rules shall be strictly interpreted to bring about maximum compliance and safe conduct and shall take precedence over any conflicting instructions. However, lawful and applicable governmental regulations which may be contrary to these rules shall control.

P-8. Amendments

Any SCE employee, safety team, or organization may propose revisions to SCE's Accident Prevention Manual. The following procedure is provided:

a. All proposed revisions shall be submitted to the business unit organization having responsibility for safety and/or health issues.

b. That business unit organization shall review the proposed revision and determine if it meets the following criteria:

   1. Is the proposed revision necessary?
   2. Is the proposed rule covered anywhere else in the manual?
   3. Is the proposed rule consistent with business unit policies?
   4. Is the proposed rule consistent with California or Nevada regulatory requirements as applicable?
   5. Is the proposed rule consistent with generally accepted safe work practices?

c. If the proposed revision meets the criteria above, then:

   1. A senior manager, a business unit safety manager or their designees and a representative to the

Leadership Safety Council shall sign the approval form for the proposed revision and forward to the Manager of Corporate Safety Policy and Regulation for review and action.

2. The Manager of Corporate Safety Policy and Regulation will review. If the proposed revision meets above requirements of b, the approval form will be signed and the proposed revision sent to the APM Rules Revision Team for review.
3. The APM Rules Revision Team will review using Originator and/or Subject Matter Experts as needed to make a determination whether to return to the submitting business unit for further work, or to forward to the Leadership Safety Council with recommendation to either approve or disapprove proposed revision.
4. If returned to the Originator, the proposed rule revision will either be reworked by the Originator as requested or dropped. If forwarded to the Leadership Safety Council for final decision, the APM Rule Revision Chairperson will present with the submitting business unit members assisting with answering additional questions. If approved, the rule will be issued on a Special Safety Bulletin from Corporate Safety, becoming effective with the date on the bulletin, be placed on Corporate EH&S website on Portal (rule revisions solely to correct typographical or grammatical errors will be issued annually in hard copy), and distributed via hard copy to those employees designated by their business unit.

P-9. Supplementary Information

Additional instructions and information relating to the safe performance of work as issued through the medium of Corporate EH&S Publications, business unit policies, letters, operating instructions, bulletins, etc., shall be used to supplement these fundamental safety rules as necessary and shall be made available by supervisors to all affected employees.

For information related to environmental requirements, such as the handling, labeling, removal, clean-up, and disposal of chemicals and to the use of approved containers for such chemicals, or to the reporting of chemical spills, refer to the business unit policies and procedures that are applicable to the work being performed.

P-10. Governmental Safety Standards

In addition to its own safety rules and practices, the Company and its employees in the performance of their work, are subject to the regulations of various governmental agencies including federal, state, county, and city. Supervisors shall make certain that all applicable provisions of governmental regulations are complied with on their jobs.

A list of the major governmental regulations or orders which may be applicable to our work and are presently in effect are as follows:

STATE OF CALIFORNIA
CALIFORNIA CODE OF REGULATIONS

Title 8 — Industrial Relations

Title 13 — Motor Vehicles

Title 17 — Public Health

Title 19 — Fire Protection

STATE OF CALIFORNIA
LABOR CODE

Division 5 — Safety in Employment

Part I — Safety and Occupational Health

STATE OF CALIFORNIA
PUBLIC UTILITIES COMMISSION

Rules for Overhead Line Construction — G.O. 95

Rules for Construction of Underground Electric Supply and Communication System — G.O. 128

Standards for Gas Services — G.O. 58-A

Gas Holder Orders — G.O. 94-A

STATE OF NEVADA
NEVADA INDUSTRIAL COMMISSION

Nevada Occupational Safety and Health Standards

Code of Federal Regulations, Title 29 LABOR:

Chapter XVII Occupational Safety and Health Administration, Department of Labor

FEDERAL OSHA

Code of Federal Regulations, Title 29 LABOR:

Chapter XVII Occupational Safety and Health Administration, Department of Labor

P-11. Care in Performance of Duties

a. Each employee shall use reasonable care in the performance of duties, and act in such a manner as to assure safety and health to themselves, their co-workers, and the public.

b. Employees shall not engage in practical jokes, scuffling, "horseplay," or the urging of persons to take unnecessary chances.

P-12. Qualifications for Duty

a. Employees shall not attempt work for which they are not mentally or physically fit.

b. Possession or use of alcoholic beverages or illegal drugs by any employee during working hours is forbidden and any violation will be sufficient cause for termination.

c. Supervisors having reasonable grounds to suspect that an employee under their jurisdiction is either mentally or physically unfit for the work assigned, shall prohibit such employee from working until satisfactory medical or other evidence indicating fitness is secured.

P-13. First Aid

a. Employees shall familiarize themselves with, the First Aid Section.

b. Every injured person shall be given first aid as soon as possible.

c. Properly equipped and approved first aid kits shall be maintained on trucks, in attended stations, and such other locations as may be considered advisable.

d. First aid kits shall be inspected at least monthly to assure readiness in the event of an illness or injury. The contents of each first aid kit shall be compared to the most current inventory list available and materials replenished after each use.

e. A list of names, addresses, and telephone numbers of ambulance services, physicians, hospitals, and member of the Company's organization who are to be called in emergencies shall be provided for all employees in authority and shall be posted in suitable locations.

f. As a first responder, you may come in close contact with people who are carriers of infectious diseases. Proper protection is important to reduce your chances of exposure and therefore decrease your chances of contracting the illness. While providing rescue breathing, use a CPR mask if possible. To protect yourself from blood or other bodily fluids, wear gloves if available. If no gloves are available, use a plastic bag, thick dressings or have the victim hold the dressing in place with their hands. In all cases, as soon as the first aid emergency is over, wash your hands and any other areas that came in contact with blood or bodily fluids with an antimicrobial soap for at least two minutes. If you have questions or concerns about your exposure, please contact SCEs Occupational Health Physician or your personal physician for recommendations.

P-14. What to do When an Accident Occurs

The following procedures covering the reporting and preliminary investigation of all accidents shall be strictly observed:

a. Injury to Employees.

1. At least one employee should stay with the injured person when possible, rendering first aid, they are qualified to perform, until medical attention is available.

2. In the event of emergency, which requires emergency medical services (EMS), fire, ambulance, rescue, etc., by whatever means available call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately. Be prepared to give the following information:

   (a). Name, nature of emergency.

   (b). Address, nearest cross street, city.

   (c). Phone number you are calling from.

   (d). Stay on the line until information is confirmed.

   Employees should follow any site-specific instructions regarding when and how to call the 911 emergency operators.

3. Employees shall report all industrial injuries and illnesses to the work location supervisor as soon as possible.

4. Supervisors shall ensure that occurrence of any of the following is reported immediately to Corporate Safety, Claims/Law, Workers' Compensation, and appropriate Business Unit Management.

   (a). Any accident or occurrence resulting in a fatality to a Southern California Edison (SCE) employee during employment.

   (b). Any accident which requires emergency medical services (EMS), fire, ambulance, or rescue.

   (c). It shall be made clear, in the initial call, who is to summon the doctor and/or ambulance. Sufficient and accurate information must be given so the doctor, ambulance, or others responding to the call will be informed of the requirements to care for the injured, and the exact location and necessary directions for reaching the scene of the accident.

5. When an employee requires non-emergency medical care for a work related injury or illness, the employee shall be initially referred to, and treated or evaluated by a medical facility designated by the Workers' Compensation Division. The Workers' Compensation Division has designated two medical facilities for each manned work location in California; a medical facility to be used during normal business hours, and an alternative facility for after hours medical care. All follow-up medical care must be provided by a member of SCE's Medical Provider Network unless the employee has designated his or her personal physician prior to the work related injury or illness. Contact the Workers' Compensation Claims Division for the names and locations of SCE's authorized industrial medical providers and facilities.

6. All serious injuries to, or death of, employees while on duty shall be reported in writing in accordance with Company instructions.

b. Injury to Non-employees.

1. All accidents which may involve the Company, resulting in personal injuries to, or death of, non-employees shall be reported immediately by the first employee having knowledge thereof by the fastest means of communication to Edison's Grid Control Center. The Grid Control Center shall notify Claims/Law.
2. Work location or department supervisors will be held responsible to see that a complete preliminary investigation is made immediately and the accident reported in writing in accordance with Company instructions.
3. First aid may be rendered if necessary but do not assume responsibility for any injury. Do not obligate the Company to pay for ambulance, doctor, or hospital services. Do not make statements admitting liability or indicating that the Company will make a settlement. Do not discuss the accident in the presence of non-employees.

c. Automobile Accidents.

In all accidents involving the operation of a Company vehicle, the employee-driver, with the assistance of other employees present, shall:

1. Stop at once. If an employee is injured, follow the provisions in Policy 14a; if a non-employee is injured, follow the provisions in Policy 14b.
2. If a vehicle or other property is damaged and the owner is not present, attempt to locate such owner and inform him/her of the accident and identify yourself. If the owner cannot be located, leave a notice with your name and address in a conspicuous place on or in the damaged property, and report the accident immediately to the law enforcement agency having jurisdiction.
3. Ascertain positively if any non-employee has been injured and report the slightest injury or suspicion thereof.
4. Obtain the names and addresses of all witnesses or possible witnesses before they leave the scene.
5. Secure all data from the operator's license of the driver of each vehicle involved and the name and address of each passenger.
6. Secure all data from the registration certificate of each vehicle, including registered owner, license number, make, model, type, and year.
7. Identify yourself to all non-employees involved in the accident and make your operator's license and the Company vehicle registration certificate available for inspection.
8. Note the time and exact location of the accident.
9. Secure accurate measurements as soon as possible before the evidence is obliterated; if exact measurements cannot be made, step off or estimate the important distances. If possible, secure snapshots before the vehicles are moved showing their position and extent of damage to each. Whenever practicable, have a mechanic inspect vehicles before they are moved. Fix position of the vehicles involved at the moment of impact, where they came to rest, skid marks, direction of vehicles, and other pertinent locations and directions, and mark them by chalk or other means to preserve the information accurately for photographs and sketches to accompany the written report.
10. Avoid discussing the accident and make no admissions of responsibility to anyone except authorized Company representatives. Necessary data given to a law enforcement officer should be given in private.
11. If injury or death results from the accident, file a written report immediately with the Highway Patrol or the law enforcement agency having jurisdiction.
12. Secure the name and badge number of any law enforcement officer who appears at the scene.

d. Property Damage.

1. All accidents resulting in damage to the property of others shall immediately be reported by the first employee having knowledge thereof to the Company personnel or office designated in Policy 14a(2).
2. Do not make statements admitting liability or indicating that the Company will make a settlement.

e. Decision for Handling Accidents.

All final decisions as to Company liability, medical care, investigation, adjustment, settlement, and related policy decisions which must be made with respect to the handling of accidents shall be made only by those to whom such authority is delegated.

P-15. Traffic

a. Knowledge and Compliance With Laws.

Drivers of vehicles shall be familiar with and obey all State Vehicle Codes, local traffic rules and ordinances, traffic control signs, posted speed limits, parking restrictions, and all Company rules and regulations governing vehicle operation.

b. License Requirements.

Drivers of vehicles shall have in their possession at all times a valid driver's license appropriate for the type of equipment to be operated. Any change in the status of an employee's drivers license shall be reported immediately to his/her supervisor.

c. Defective Equipment.

Drivers shall not operate vehicles with faulty brakes or mechanical defects such as faulty steering mechanism or lights, except to proceed to a place where repairs can be made, and then only at such reduced speed or in such a manner that will enable the movement to be

made safely. Such conditions shall be reported in writing in accordance with existing instructions.

d. Distracted Driving

Employee use of all company-provided hand-held portable electronic devices is prohibited while driving. In addition, personal hand-held portable electronic devices are prohibited while driving on company business and property.

EXCEPTIONS: Where it is legally permitted, the following exceptions apply:

1. Hands-free cellular phones
2. 800/900 MGHz radios

DEFINITIONS: Hand-held electronic devices includes: cell phones, BlackBerrys, pagers, Personal digital assistants (PDAs), portable Global Positioning Systems (GPS), meter reading hand-held devices and other portable electronic communication devices

Use of hand-held electronic devices includes: talking, dialing, checking voicemail messages, entering data or reading text.

Vehicles include: autos, light-medium-heavy duty trucks, motorcycles, as well as such mobile equipment as fork-lifts, cranes, heavy equipment, road graders, golf carts, bucket-boom trucks, tracked crawlers, platforms and truck mounted cranes.

P-16. Fire Protection

See Fire Information, Rules, and Education Manual.

P-17. Use of Safety Devices

All safety devices furnished by the Company shall be properly used by all employees as required. These devices will be regularly tested as required and kept in good repair by the Company, but this will not relieve the employee of the responsibility of using only those in good condition.

P-18. Reporting Hazards

a. Employees shall immediately report any defective tool, apparatus, equipment, or other hazardous condition or work practice to the most available supervisor.

b. Unsafe or unhealthy conditions and/or work practices shall be corrected as soon as is practical.

c. When an imminent hazard exists which cannot be immediately corrected without endangering employees, all personnel shall be removed from the area except those necessary to correct the hazardous condition. Employees necessary to correct the condition shall be provided necessary safeguards.

d. Employees are encouraged to make recommendations which serve to improve the injury and illness prevention program, and to do so without concern for criticism or reprisal.

P-19. Scheduled Inspections, Housekeeping, Clean and Orderly Premises

a. Supervisors shall conduct or cause to be conducted, periodic inspections of work locations under their area of responsibility for the purpose of identifying and correcting unsafe conditions and work practices. A written report of such inspection shall be kept at the work location and shall include:

1. Name of person conducting the inspection
2. Any unsafe condition or work practice identified
3. Corrective action taken

b. Combustible materials, such as oil-soaked and paint-covered rags, waste, shavings, packing, and rubbish shall not be allowed to accumulate on benches, floors, or yards, except in areas provided therefore.

c. Permanent floors and platforms shall be reasonably free of dangerous projections or obstructions and shall be maintained in good repair, and reasonably free from oil, grease, or water. Where the type of operation necessitates working on slippery floor areas, such surfaces shall be protected against slipping by the use of mats, grates, cleats, or other methods employed to provide equivalent protection. Floors and platforms shall be constructed and maintained to safely support the loads to which they are subjected.

d. Stairways, aisles, exits, roadways, walkways, and material storage areas in yards shall be kept reasonably clear and free from obstructions, depressions, and debris.

e. Material and supplies shall be stored in an orderly manner to prevent their falling or spreading and to eliminate tripping and stumbling hazards.

P-20. Tailboard

a. A tailboard, means, tailboard conference, pre-job briefing, tailgate meeting, or job procedure discussion, or talking the job over before starting to work to ensure all supervisors and members of each crew involved thoroughly understand the job to be performed and the method of accomplishing it in a safe manner. Before the start of each job or in the event the scope of the job changes, every supervisor shall call his/her crew together and outline the proper work procedure to be followed in such a manner that the following will be accomplished:

1. Each employee will understand the purpose and critical steps of the job.
2. Each employee will understand what he/she is to do.
3. Each employee will understand what the other employees involvement in the work assignment are to do.
4. Each employee will understand the supervisor's manner of fulfilling the work assignment, including understanding the criteria for backing out of a job when unexpected conditions arise.

5. Each employee will understand the hazards or trouble spots involved and will take the necessary actions to overcome such problems and, if applicable, what personal protective equipment (PPE) will be required.
6. Each employee shall be notified by the supervisor or other employee in charge of the conditions or clearance of lines or equipment before work is started. Where applicable, the supervisor shall notify each employee of any change to the conditions or status of lines or equipment. When the supervisor is not present at job site and either expected job conditions are found to be different from initial tailboard or later change, work will be stopped until the supervisor is notified by the involved employee(s) and an agreement of how to safely handle the new conditions will be reached before work proceeds.

b. An employee working alone shall perform a self tailboard, as outlined in P-20 a. to ensure all tasks and hazards are identified, and shall take the necessary actions to overcome such hazards prior to performing the task.

P-21. Radiation Protection at Nuclear Generation Stations

a. Personnel Exposure to Radiation.

It is the policy of Southern California Edison Company to keep all personnel radiation exposure as low as reasonably achievable.

b. Personnel Responsibility.

1. The primary responsibility for radiation protection lies with the individuals and their supervisors. It is, therefore, the responsibility of individuals to keep their exposure as low as reasonably achievable, consistent with discharging their duties and in accordance with applicable standards. Each individual is also responsible for the safety and welfare of others in the area, and for observing all rules and procedures.
2. It shall be the responsibility of Radiation Protection supervision to evaluate radiological conditions in a nuclear generating station, to establish radiological procedures to be followed for safety of personnel, to assure that all applicable federal and state regulations are complied with, and that required personnel radiation exposure records are maintained.
3. It shall be the responsibility of each supervisor to see that radiological safety rules and procedures are complied with, that personnel are properly instructed in radiation protection, and that work involving radiation is performed in a safe and approved manner.
4. Nuclear generating station personnel shall advise Radiation Protection personnel immediately of any unusual incident involving radiation, or of any anticipated changes in procedures or working conditions which have not previously been evaluated by Radiation Protection personnel

P-22. Hazard Communication

a. The Hazard Communication Program is applicable at all SCE work locations and their respective business units. Each business unit shall develop an organization specific Hazard Communication Implementation process that meets the requirements and minimum standards of this program to ensure their employees receive timely information on the hazardous substances they use or are exposed to while performing their work activities.

b. A copy of the Hazard Communication Program and the Hazard Communication Program Implementation Process shall be maintained at each site.

1. Corporate EH&S has developed guidance for implementing the requirements of this program. Information regarding the SCE Hazard Communication Program can be found on the Corporate Environmental Health & Safety Portal.

Section 100
GENERAL RULES

101. Limitations on Access to Vicinity of Company Facilities

a. Minors, visitors, or uninstructed persons shall be accompanied by a qualified employee in stations and around Company properties where life, service, or property might be endangered.

b. Where requests have been received from a third party, the supervisor (or authorized representative) having jurisdiction shall be the Company representative designated to make, if practical, the arrangements in implementing the safety measures required of those operating equipment within the vicinity of high-voltage lines by the State of California High-Voltage Electrical Safety Orders, Article 36. Status of line changes, if any, shall be confirmed in writing by both parties.

102. Operations to Be Done by Authorized Persons Only

All station operations shall be performed only by or under the direct and specific authorization of the station operator or, if no operator is on duty, then by an authorized person.

103. Locking Stations and Enclosures

All stations and gates to switch structures containing energized high-voltage equipment shall be kept closed and locked at all times except when a qualified employee has such station or structure under observation.

104. Live Line Tools

a. All work requiring the use of live line tools shall be performed in accordance with applicable Accident Prevention Rules.

b. All live line tools shall be approved by the Corporate Safety Department before being put into use. No alterations shall be made without approval.

c. Live line tools shall be visually inspected for defects before use each day. Tools to be used shall be wiped clean and if defects are indicated such tools shall not be used.

105. Clearances

a. Before any employee starts work on de-energized equipment, apparatus, or lines for which clearances are required, the employee shall either obtain a clearance or report to, and work under, a qualified employee who holds a clearance.

b. Clearances are required to work on de-energized generating station or substation apparatus or equipment which is normally energized above 600 volts.

c. Clearances are required to work on de-energized lines or line sections above 600 volts. When clearances are required, they shall be taken in accordance with the 700 Section of the Accident Prevention Manual.

EXCEPTION: On distribution tap lines with a single source of supply, the person in charge of the distribution crew or Troubleman must issue a formal clearance to himself or another qualified person of the crew prior to working on an electric line or some piece of operating equipment which is inherently too hazardous to work on while in service. The following shall be provided to the Switching Center and Distribution Operations Center prior to de-energizing any distribution tap line:

1. Name, radio call number or cell telephone number
2. Circuit name and voltage
3. Identify work to be performed and location
4. Identify method to de-energize tap line
5. Estimated timeframe if de-energizing tap line

106. Lockout and/or Tagout (Hazardous Energy Control)

Each organization shall develop and utilize procedures for hazardous energy control to prevent inadvertent movement of machinery or equipment or release of stored energy which could cause injury to employees. This rule is not applicable for transmission or distribution lines or for substation electrical equipment. (See Rule 105 and Section 700 for clearance requirements for T&D)

This procedure applies to employees engaged in the cleaning, repairing, servicing, setting-up, and adjusting of prime movers, machinery and equipment. The procedure shall clearly outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy and the means to enforce compliance and shall, at a minimum, include the following components:

a. A statement of the intended use of the procedure.

b. The procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy.

c. The procedural steps for the placement, removal and transfer of lockout devices and tagout devices and responsibilities.

d. The requirements for testing a machine or equipment, to determine and verify the effectiveness of lockout devices, tagout devices and other hazardous energy control devices.

e. The hazardous energy control procedures shall be documented in writing.

f. The hazardous energy control procedure shall include separate procedural steps for the safe lockout/tagout of each machine or piece of equipment affected by the hazardous energy control procedure.

g. Machinery or equipment capable of movement shall be deactivated, de-energized or disengaged to prevent inadvertent movement during cleaning, servicing, and adjusting operations, and the moveable parts shall be mechanically blocked, locked out and/or tagged out.

h. Prime movers, equipment, or power driven machines equipped with lockable controls shall be locked out and/or tagged out during, repairing and setting-up operations.

i. Signs, tags, locks, seals or other similar attachment devices shall be secured to the controls or power source of the prime movers, machinery, and equipment.

j. When utilizing a seal or other similar attachment device on a lockable control, the device(s) shall be of a non-reusable type, attachable by hand, self locking and non-releasable with a minimum unlocking or breaking strength of no less than 50 pounds. When a seal or other attachment device is used on an energy isolating device, which is capable of accepting a lock, the seal or attachment device shall be attached at the same location the lock would have been attached, and provide the same equivalent of safety to employees.

k. Inspections:

   1. Inspection of the energy control procedure shall be conducted at least annually to evaluate its effectiveness and determine the necessity for updating the written procedure.

   2. The inspection shall be performed by an authorized person other than the one(s) utilizing the energy control procedure and shall be documented in writing.

   3. The inspection documentation shall identify the machine or equipment, the date of the inspection, the name(s) of the employee(s) included in the inspection, and the person conducting the inspection.

l. Training:

   1. Authorized employees shall be trained on hazardous energy control procedures and on the hazards related to performing activities required for cleaning, repairing, servicing, setting-up and adjusting prime movers, machinery and equipment.

   2. Each affected employee shall be instructed in the purpose and use of the energy control procedure.

   3. All other employees whose work operations may be in an area where energy control procedures may be utilized shall be instructed about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

m. Whenever non-Edison personnel are used to perform work on company machinery or equipment, they must follow the on-site Edison lockout/tagout procedure.

   NOTE: For the purpose of Rule 106, "lockout/tagout" means the use of devices, positive means and procedures which will result in the effective isolation or securing of prime movers, machinery and equipment from mechanical, hydraulic, pneumatic, chemical, electrical, thermal or other hazardous energy sources.

107. Working on Station Equipment

No person shall work on any station equipment without first obtaining proper authorization from the operator in charge or the watch engineer. The person desiring to work shall specifically state what work he/she intends to do, what equipment is to be worked on, and the work area.

108. Rubber Gloves

Approved rubber gloves shall be worn at all times when working on exposed energized conductors rated from 120 volts to 17kV (a/c nominal) unless performing work with live line or other approved insulated tools. When working with rubber gloves on overhead primary conductors or equipment energized in excess of 7,500 volts, insulate/isolate practices shall be used in accordance with approved business unit procedures. When this work is performed from an aerial lift/digger derrick, a qualified person trained in first aid/CPR, radio procedures, aerial lift controls and rescue procedures shall be present on the ground. The qualified person shall have access to the lower horizontal and vertical positioning controls for the aerial lift/ digger derrick in case of an emergency.

NOTE: Rubber gloves are not approved for use in-lieu of applying personal grounds on de-energized and un-grounded high voltage overhead conductors while working at ground level.

109. Clothing/PPE

a. Employees shall wear suitable clothing at all times to minimize work hazards and under any conditions as the supervisor in charge shall direct.

b. Employees shall wear approved head protection when working:

   1. In locations where there is a risk of receiving head injuries from flying or falling objects, electric shock and burns, or substances are inherent in the work or environment.

   2. On poles, structures, or in an aerial device. (e.g. Bucket truck, pin-on platform, crane basket.)

   3. In switch racks.

   NOTE: Head protection shall not have unapproved accessories, flammable or conductive materials attached.

c. A garment with full length sleeves (rolled down) shall be worn when working with:

   1. Wood poles or cross arms.

   2. Hot or injurious liquids or materials.

   3. Open flames or sparks.

   4. Or in proximity to exposed energized lines or equipment.

d. Appropriate gloves shall be worn while working with:

1. Wood poles or cross arms.
2. Hot or injurious liquids or materials.
3. Open flames or sparks.

e. Employees working on or near exposed electric conductors or equipment energized at 50 volts (a.c./nominal) or greater shall not wear clothing made of, or which contain, synthetic fabrics such as acetate, nylon, polyester, or rayon that have not been treated for flame retardancy.

f. Employees who enter underground vaults, manholes, CST/SOE or BURD enclosures containing cable or equipment energized above 300 volts (a.c./nominal) shall wear approved flame retardant/flame resistant coveralls or rainwear with full length sleeves rolled down.

g. Employees performing station switching on electric conductors or equipment normally energized in excess of 600 volts shall wear approved flame retardant/flame resistant clothing with full-length sleeves rolled down, approved arc rated face shield with chin guard.

h. When working on exposed energized three phase systems in padmount transformers, pull sections, or electrical panels, approved eye protection devices and a hard hat full arc rated face shield with chin guard attached shall be worn.

i. When operating single fuse positions in a PMH Switch, flame resistant coveralls, or flame resistant rainwear (with sleeves rolled down), gloves, approved eye protection devices and a hard hat with full arc rated face shield with chin guard attached shall be worn.

j. While in the process of removing and/or replacing fuses within an in-service BURD Switches (connected to a distribution system), employees shall wear flame resistant shirts, flame resistant coveralls, or flame resistant rainwear (with sleeves rolled down), gloves, approved eye protection devices, a hard hat, and a flame resistant (FR) balaclava. This subsection does not apply to BURD Switches which have been isolated (line and load) or grounded.

NOTE: Face Shields shall only be worn over, or in conjunction with, approved eye protection. Face Shields are not approved eye protection.

110. Smoking

a. Employees shall not smoke in proximity to flammable liquids, explosives, or gases or where "No Smoking" signs are displayed, either on property occupied by the Company or on the premises of other persons.

b. Matches, cigars, cigarettes, tobacco, or other substances must not be discarded while still burning except when placed in a proper receptacle or otherwise disposed of safely.

c. Smoking shall not be permitted in areas indicated as danger zones or areas closed by federal, state, county, or city officers.

d. When hydrogen-filled equipment, such as generators and synchronous condensers are out of service for overhaul, smoking or open flames shall not be permitted around the unit until all hydrogen has been purged from the equipment and the unit is declared safe to enter.

Smoking or open flames shall not be permitted while filling the equipment with hydrogen. The area around the equipment shall be roped off and plainly marked and posted with approved signs during these operations.

e. Smoking in enclosed facilities is prohibited.

111. Sight Protection

Approved eye-protective devices are provided on jobs that require eye protection. Such devices should fit properly, be kept clean at all times, shall not be altered, and shall be worn when an employee is engaged in or in the vicinity of work involving:

a. The handling of exposed energized parts of equipment or systems energized at 120 volts or more between conductors.

b. Drilling or chipping stone, brick, concrete, paint, pipe coatings, or metal.

c. Grinding, buffing, or wire brushing, whether there is a guard or not.

d. Dust or flying particles.

e. Welding, cutting, or burning.

f. The use of hot or dangerous substances.

g. Injurious light or heat rays.

h. While mixing or working around injurious chemicals.

i. When wearing a face shield where eye protection is required.

j. Any other job where there is recognized danger of eye injury.

NOTE: Face Shields shall only be worn over, or in conjunction with, approved eye protection. Face Shields are not approved eye protection.

112. Protection From Dusts, Fumes, Vapors, or Gases

Where it is impracticable to eliminate harmful quantities of dusts, fumes, vapors, or gases, every employee in the zone of contamination must be protected in a manner which will ensure a supply of clean air. Otherwise, approved respiratory equipment shall be used. Information and requirements for selection, fit, and use of respirators are contained in the SCE Respiratory Protection Manual (SCE 40-41).

113. Poisons

a. Before handling poisonous, infectious, or corrosive substances, such as acids, solvents, leads, etc., employees shall thoroughly familiarize themselves with the hazards involved and utilize all necessary pre-

cautions, protective devices, and/or equipment. Particular care shall be exercised by persons with open sores.

b. Employees shall not handle food, tobacco, etc., with such poisonous substances on their hands.

114. Radio Frequency (RF) Energy Exposures

Each organization having employees who may potentially be exposed to radio frequency (300kHz to 100 GHz) energy exceeding the Federal Communications Commission (FCC) occupational exposure limits shall develop training programs and minimum working procedures, for the purpose of preventing such exposures.

a. Only employees trained on RF safety procedures (qualified employees) shall be allowed to work in posted, or known, areas where radio frequency energy may exceed public exposure limits, or on towers, poles or other structures where telecommunication antennas have been installed.

b. Employees shall not work beyond posted signs that say, "Caution — Beyond This Point: Radio frequency fields at this site may exceed FCC rules for human exposure", unless it has been determined, through monitoring or calculations, that it is safe to do so.

c. Employees shall not work beyond posted signs that say "Warning — Beyond this point: Radio frequency fields at this site exceed the FCC rules for human" or "Danger" unless RF sources have been de-energized and it has been determined, through monitoring, that it is safe to do so.

d. Qualified employees must follow business unit work procedures while working near AM/FM/TV broadcast sites, near third party RF antennas, and beyond posted RF areas.

e. Employees shall not approach energized antennas that are attached to SCE poles, towers, or other structures such as the top of buildings, closer than shown in the following table, unless additional safety measure have been taken, per business unit procedures. Figures 1–3 display drawings of omni directional, directional and microwave antennas. Figures 4 and 5 illustrate the approach distances for omni directional and directional antennas.

NOTE: Low-powered devices such as cell phones, SmartConnect™ meters and relays, and NetComm devices are not covered by these approach distances.

Work Location	Closest Horizontal Approach Distance
Passing by at the same level as omni directional antennas	3 ft.
Working at the same level near omni directional antennas	10 ft.
Working within 2 feet above or below omni directional antennas	3 ft.
Passing by at the same level in front of directional and microwave antennas	3 ft.
(continued)	
Passing by at the same level behind directional and microwave antennas	1 ft.
Working at the same level behind directional and microwave antennas	3 ft.
Working at the same level in front of directional and microwave antennas	10 ft.
Working within 2 feet above or below in front of directional and microwave antennas	4 ft.

f. All antennas are to be considered energized unless confirmation has been obtained that they have been de-energized, and will remain de-energized, in accordance with appropriate procedures.

NOTE: The SCE RF Safety Program (EHS-CS-009) is an integral part of the Corporate EH&S management system. This program provides requirements for identifying, evaluating, and working near or around RF emitting antennas. For additional guidance, refer to the Corporate Environmental Health and Safety website.

Figure 1.
OMNI-DIRECTIONAL ANTENNA

Figure 2.
DIRECTIONAL ANTENNA

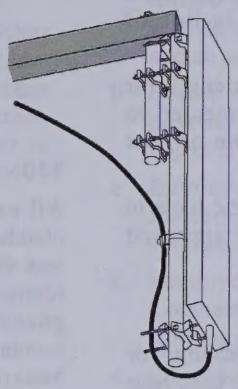


Figure 3.
MICROWAVE ANTENNA

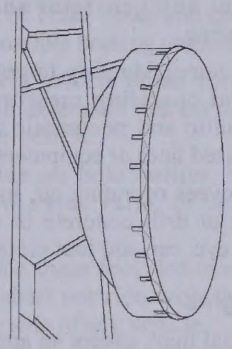


Figure 4.
CLOSEST HORIZONTAL APPROACH DISTANCES FOR OMNI-DIRECTIONAL ANTENNAS

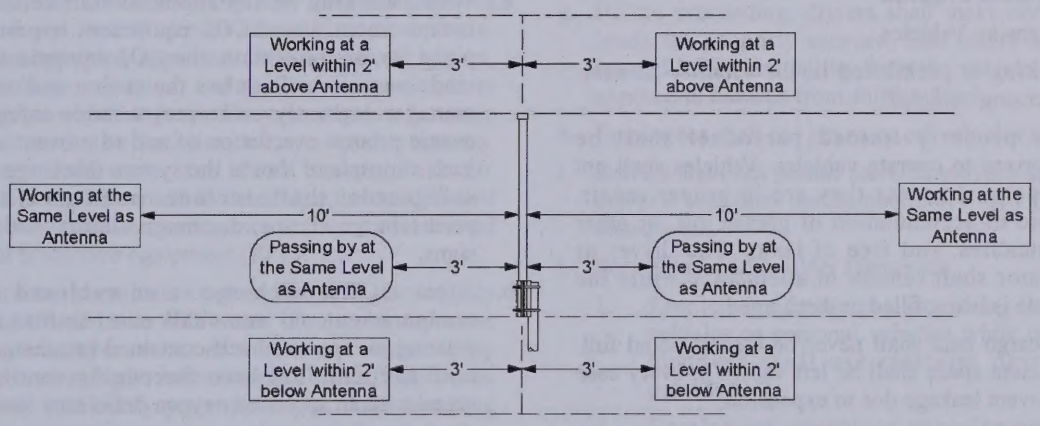
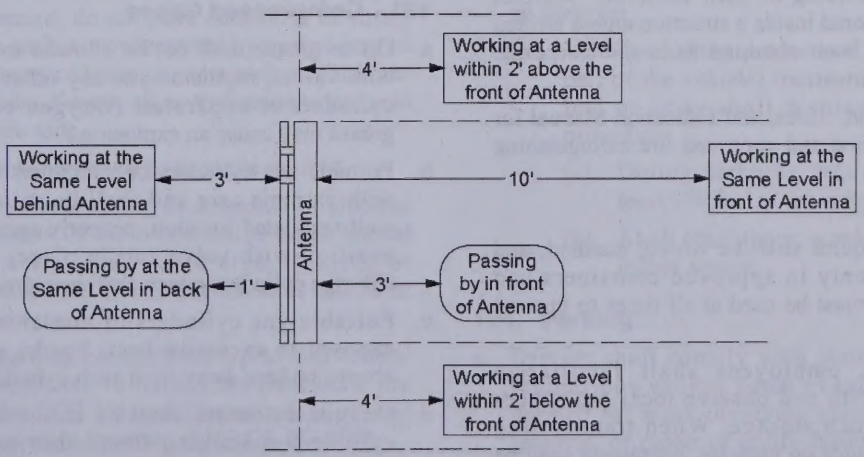

Working at a Level within 2' above Antenna
3'
3'
Working at a Level within 2' above Antenna
Working at the Same Level as Antenna
10'
10'
Working at the Same Level as Antenna
Passing by at the Same Level as Antenna
3'
3'
Passing by at the Same Level as Antenna
Working at a Level within 2' below Antenna
3'
3'
Working at a Level within 2' below Antenna

Figure 5.
CLOSEST HORIZONTAL APPROACH DISTANCES FOR DIRECTIONAL AND MICROWAVE ANTENNAS


4'
Working at a Level within 2' above the front of Antenna
Working at the Same Level behind Antenna
3'
10'
Working at the Same Level in front of Antenna
Antenna
Passing by at the Same Level in back of Antenna
1'
3'
Passing by in front of Antenna
4'
Working at a Level within 2' below the front of Antenna

115. Portable Tools

a. Noncurrent-carrying metal parts of portable electric power tools shall be grounded, or if supplied by a portable generator, the noncurrent-carrying metal parts of tool and generator shall be bonded in lieu of grounding.

b. Only nonconducting hoses of adequate strength for normal operating pressure are to be connected to hydraulic and pneumatic tools operated on or near energized lines or equipment.

c. Employees operating air, hydraulic or electric tools to break or drill concrete or rock shall wear approved head, eye, ear, and foot protection.

116. Lights

No artificial light, except an approved electric flashlight or an approved extension cord and fixture, shall be used near escaping gas or gasoline or other flammable vapors, or when entering a room or enclosure suspected of containing gas.

117. Flammable Liquids

a. Fuel-Dispensing Vehicles

1. Smoking is prohibited in the vicinity of fuel-dispensing vehicles.

2. Only properly trained personnel shall be authorized to operate vehicles. Vehicles shall not be operated unless they are in proper repair, devoid of accumulation of grease, oil, or other flammables, and free of leaks. The driver or operator shall remain in attendance while the vehicle is being filled or discharged.

   The cargo tank shall never be loaded liquid full. Sufficient space shall be left vacant in every case to prevent leakage due to expansion.

3. Storage

   Fuel-dispensing vehicles shall be stored only at designated locations not less than 50 feet from any building (except buildings approved for storage or servicing of such vehicles). Vehicles shall not be stored inside a structure unless written approval has been obtained from the Corporate Safety Department.

b. See Fire Information, Rules, and Education Manual for additional information and approved fire extinguishing equipment.

c. Flammable Liquids

1. Flammable liquids shall be stored, handled, and transported only in approved containers and extreme care must be used at all times to prevent ignition.

   In addition, employees shall familiarize themselves with and observe local ordinances relative to such storage. When transporting flammable liquids on vehicles, containers shall be properly secured and carried outside of the driver or passenger compartments.

2. When pouring or pumping gasoline from one container into another, metal contact shall be maintained between the pouring and receiving containers.

3. When refueling vehicles, employees shall remain in attendance at all times.

118. Rotating Shafts

All exposed parts of line or countershafts, or collars, clutches, cut-off couplings and clutch pulleys seven feet or less above floor or other normal working surface shall be identified and evaluated to determine the appropriate guarding required to protect against the hazard of accidental contact. All guards shall be appropriate for the hazards involved, secured in place, constructed of substantial material and have surfaces free of hazardous projections.

119. Work in CO2 Rooms

a. When working in any room, switch cell, or other compartment where CO2 equipment is permanently piped for fire protection, the CO2 equipment must be made nonautomatic unless the station and/or division manager expressly authorizes suitable safeguards to ensure prompt evacuation of and to prevent entry into such atmosphere should the system discharge. Suitable safeguards shall include personnel training, predischarge alarms, discharge alarms, and warning signs.

b. After a CO2 discharge in an enclosed room or compartment, no one shall enter unless they are wearing an approved self-contained breathing mask or until the room has been thoroughly ventilated and tested with an approved oxygen deficiency tester.

120. Compressed Air

Compressed air shall not be used to clean the clothing or hair, or be turned against any employee for any reason.

121. Compressed Gases

a. Oil or grease shall not be allowed to come in contact with valves, regulators, or any other parts of oxygen cylinders or apparatus. (Oxygen contacting oil or grease may cause an explosion.)

b. Portable gas cylinders or containers shall be handled with extreme care and shall be stored in a suitable, well-ventilated location, properly secured in a vertical position with valve cap in place, except one-ton chlorine cylinders which shall be stored horizontally.

c. Portable gas cylinders or containers shall not be exposed to excessive heat. Sparks and flames shall always be kept away from such cylinders or containers.

d. Oxygen cylinders shall be stored separately from cylinders containing flammable gases (hydrogen, butane, propane, acetylene, etc.) and from oils, greases,

or flammable liquids. A distance of at least 20 feet, or a 5 foot high non-combustible barrier having a fire resistance rating of at least 1/2 hour shall be the minimum separation.

e. All connections to piping, regulators, and other appliances shall be kept tight to prevent leakage. Should leaks develop, use only soap and water solution or equivalent to make leak tests; never use open flames. When cylinders or containers are not in use or in transit, caps must be in place and cylinders secured to prevent falling or rolling.

f. Compressed gases shall not be used from a cylinder or cylinder manifold or other container unless an acceptable pressure regulating device is installed on the cylinder, valve, or manifold, except that regulators shall not be required with fuel gases used from cylinders through torches or other devices which are not equipped with shutoff valves.

122. Hazardous Chemicals

a. Employees handling hazardous materials, substances or chemicals shall, where appropriate, keep their sleeves rolled down, wear approved respirator, or self-contained breathing apparatus (SCBA), aprons, gloves, eye, and face protection, and shall take precautions to prevent personal injury. They shall also become familiar with the location of eye-wash stations, emergency showers, and wash basins. Periodic inspections shall be made to determine the condition of the eye-wash stations, emergency showers, and related personal protective equipment (PPE).

   If hazardous chemicals contact the skin, thoroughly wash the affected area with water. If cuts, skinned areas or abrasions, eyes, nose, or mouth are contacted by hazardous chemicals, immediately flush affected area with water and notify your supervisor. After handling equipment containing chemicals, wash hands before leaving the area.

b. Reasonable safeguards, including protection against earth tremors, shall be taken in storing hazardous chemicals to prevent injury to persons or property. To prevent a fire hazard, do not store containers of strong reducing agents such as concentrated hydrazine next to containers of strong oxidizing agents such as chromate or dichromate salts. Do not allow hydrazine to come in contact with these salts.

c. All chemical containers shall be properly marked.

d. Because of the volatile nature of ammonia or chlorine solutions, containers of the concentrated liquid should be opened in a well-ventilated area. Pouring or pumping these solutions into open containers should be done with caution.

e. Information regarding recognition, types, and control of potential exposures to hazardous chemicals are contained in the SCE Hazard Communication and Chemical Management Program (EHS-CS-PG-004).

123. Transportation

a. When operating a brake-equipped trailed vehicle, brake test shall be made on the towing vehicle each time the trailed vehicle is coupled or uncoupled and shall include visual inspection of brake hoses and couplings, and an actual test of all possible braking combinations.

b. Before starting to move a vehicle either forward or backward, the driver shall determine that no person or object is in the path of the vehicle.

c. Employees shall not ride on pole dollies, trailers, fenders, running boards, side rails, or on top of vehicles.

d. Employees shall ride in the space provided therefore in Company vehicles and shall not ride with their legs hanging out of the rear or side of any vehicle.

e. Employees shall remove their climbers before riding in a vehicle.

f. All sharp tools, such as saws, chisels, axes, knives, etc., carried on vehicles shall be so stored or guarded to prevent injury.

g. Before proceeding, drivers shall make certain that all loads are properly secured, that riders are properly located to prevent falling from the vehicle, and are not exposed to hazards from shifting loads.

h. Employees shall not get on or off vehicles in motion.

i. Drivers shall not permit more employees to ride on the driver's seat than the number for which the seat was constructed.

j. Seat Belts and Shoulder Harnesses

   1. Employees operating or riding in Company vehicles or personal vehicles while on Company business shall use restraint devices where provided.

   2. Employees operating vehicles on Company business shall require all passengers to use restraint devices.

k. When outriggers are lowered or raised, they shall be within the view of the operator or shall be directed by an observer.

   1. Vehicles having projections to the rear (load or part of the vehicle) four or more feet beyond the bed or body shall display at the end of the projection:

      (a). During darkness, two red lights visible at least 500 feet to the sides and rear; and,

      (b). At all other times, a red flag not less than 16 inches square.

124. Parking

a. Drivers shall comply with state and local parking regulations except when exemption therefrom is granted for work involving construction, operation, removal, or repair of utility facilities. Vehicles parked under the foregoing special conditions must be protected by specified warning devices.

b. When any motor vehicle is parked on a grade, the operator shall turn the front wheel against the curbing, set the emergency brake, and place the transmission in gear or parking position. Chocks, where provided, shall be used where there are no curbs, or where other conditions require.

c. The operator shall not leave the controls of any vehicle or mobile equipment parked in such a position that it might coast or free wheel from its parked position.

125. Vehicle Booms, Ladders, and Lifts

a. Drivers of vehicles equipped with booms used for setting or removing poles, truck-mounted ladders, mechanical or hydraulic lifts, hole diggers, or similar equipment, shall not drive with such equipment in an elevated or partially elevated position. Provided, however, this shall not preclude the movement of vehicles so equipped at the same job location with the boom in an elevated or partially elevated position.

b. Notwithstanding the provisions of subparagraph a. above, special equipment for which a valid variance permit has been secured from the proper governmental agency, and which has been individually approved by the superintendent or manager in charge, may be operated with the boom in a partially elevated position or projecting beyond the vehicle while traveling on streets or highways.

c. Riding in the basket, bucket or pin on platform of an aerial lift truck which is traveling between work locations is not permitted. Employees may ride for short moves at the work location to reposition the truck for a better boom angle, but only with the boom in the cradled position.

EXCEPTION: See Rule 167 for exceptions allowed for towering work.

126. Cranes, Hoists, Derricks, Booms, and Winches

a. A crane, boom, derrick, hoist, or winch shall not be loaded beyond the rated capacity or safe working load, whichever is smaller. These shall be operated only by qualified and authorized persons.

b. When mobile hoists, cranes, booms, or other similar lifting devices are used near energized lines or equipment, employees operating this equipment shall not stand on a grounded surface, other than the equipment itself. All other persons shall remain in the clear until the equipment is in a safe position. The person in charge shall check and determine that all persons remain in the clear while the vehicle is being moved or the boom is being repositioned. (See Rule 147)

c. Employees shall not ride on loads.

d. Operators shall not move loads over the heads of employees or others, including those in vehicles, unless authorized by the supervisor. Operators shall not leave cranes, hoists, or derricks unattended while load is suspended, unless suspended over a barricaded area, blocked, or otherwise supported from below during repair or emergency. Employees shall not stand or pass under a suspended load.

e. Employees shall not ride on the steps of locomotive cranes.

f. Crane, hoist, or derrick operators shall take signals from only one person during operations. Only qualified and authorized employees shall give signals.

g. Standard signals as set forth in the T&D Overhead Rules shall be used to signal derrick, crane, and overhead traveling crane operators. The appropriate chart shall be conspicuously posted in the vicinity of hoisting operations (cage or cab if so equipped) depicting and explaining the system of signals to be used.

h. A warning bell shall be sounded when overhead traveling and gantry cranes (controlled from a cage) are in motion or loads are being moved overhead.

i. A suitable warning device shall be sounded before moving a locomotive crane.

j. Safety switches shall be opened before changing the power cable on a gantry crane.

k. Rigging equipment shall be carefully inspected before and after use. Defective equipment shall be repaired or discarded immediately.

l. All crane controls, including limit switches, shall be tested before the equipment is first operated after the start of each shift.

m. Portable cranes, hoists, and derricks shall be positioned, equipped, protected, and/or operated so that no part comes closer to energized power lines than indicated in this table:

Nominal Voltage kV Phase to Phase	Minimum Required Clearance (Ft.)
.6 to 50	10 ft.
50 to 75	11 ft.
75 to 125	13 ft.
125 to 175	15 ft.
175 to 250	17 ft.
250 to 370	21 ft.
370 to 550	27 ft.
550 to 1,000	42 ft.

NOTE: These clearances do not apply to such equipment when used for authorized work on overhead and underground conductors, structures, or appurtenances by qualified persons.

127. Work Area Protection and Traffic Control

a. Approved warning signs, barriers, guards, flags, and lights at night, shall be installed and properly maintained wherever hazards exist due to moving or stationary vehicles, exposed energized parts, open excavations, construction operations, open walk-in

vaults or open underground structures. Approved equipment and methods for work area protection are displayed in the Work Area Protection and Traffic Control Manual.

b. Warning equipment shall be placed to provide adequate notice to motorists or pedestrians they are approaching an excavation, obstruction, or other hazard. Warning signs shall be removed as soon as the excavation, obstruction, or other hazard is cleared.

c. Where approved signs or barricades do not provide the necessary traffic control, flaggers shall be provided.

   Only properly instructed personnel shall be used as flaggers. Flaggers shall wear approved vests and they shall be reflectorized when worn at night. During the hours of darkness, flaggers shall be illuminated and clearly visible to approaching traffic.

   Where flaggers are utilized, the stop/slow paddle shall be used. However, where paddles are not available and a danger to the traveling public or employees exists, red flags may be temporarily used.

d. Employees on foot, exposed to the hazard of vehicular traffic, shall wear traffic vests. Once traffic control has been established these vests are no longer required.

e. Flashing Amber Warning Lights shall be used on Personnel Aerial Lift Equipment in use. When proper traffic control has been established, the use of amber lights are no longer required.

128. Barrier Tape and Guard Rails

Suitable barrier tape shall be used to mark off and bar approach to hazardous areas. When suitable barrier tape is used to surround or isolate high voltage electrical equipment, an employee shall not be permitted to cross over or under the tape while it is barricading an area, except in an emergency or when work in progress requires the employee to enter the hazardous area. While in the area, the employee shall be continuously watched by another qualified employee

The following colors shall be used when barrier tape is used:

Red:	Danger or Stop
Orange:	Identification of hazardous parts or machines
Yellow:	Caution
Blue:	Safety Information
Purple:	Radiation Hazards

Floor openings and openings in walkways shall be guarded by a cover, a standard guardrail, or shall be constantly attended. Toeboards shall be installed where persons may pass underneath or there is moving machinery or equipment with which falling material could create a hazard.

129. Removing Safety Guards

a. Safety guards shall not be removed except on approval of the foreman, supervisor, or other person in charge, and after necessary steps have been taken to ensure the safety of employees and the public.

b. Where regular safety guards are removed, they shall be replaced or suitable temporary guards provided before returning to normal operation.

130. Safety Straps, Life Lines, Railings, etc.

a. Employees shall use approved body belts and safety straps, lifelines, or other adequate protection as required when working in elevated positions.

b. It shall be the employee's duty to inspect each safety device, whether furnished by the Company or personally owned each time it is used, and to use only those that are in good condition.

c. No employee shall be elevated in a boom-type aerial bucket or work platform without first being secured with a lanyard and a full-body harness.

   NOTE: When working from pin-on platforms, employees shall utilize a Lineman's body belt and safety strap. If a lanyard is utilized, it shall be of such length as to limit a free-fall to as short a distance as practicable, not to exceed six feet.

d. Employees shall look to make sure that the snap hook is properly engaged in the "D" ring before the weight of the body is placed on the safety strap. When the strap is in use, both snap hooks shall not be attached to the same "D" ring.

e. Wire hooks shall not be used on body belts.

f. When working over or near water and the danger of drowning exists:

   1. Employees shall wear approved life jackets or buoyant work vests when working alone.

   2. When employees are not working alone, approved life jackets or buoyant work vests shall be worn or, at least one approved ring buoy with a minimum of 90 feet of 600 pound capacity line shall be immediately available.

   NOTE: Proper use of a safety strap, a lifeline, or a properly installed approved safety net will be considered as eliminating the danger of drowning.

g. An employee using a boatswain chair shall be secured with a safety belt to a safety line attached to a fixed part of the structure being worked upon. Boatswain chairs shall be periodically inspected. The cables, seats, and mechanism shall be maintained in a safe condition.

h. No welding, burning, or sandblasting shall be done from a boatswain chair suspended by a fiber rope.

131. Care and Testing of High- and Low-Voltage and Dielectric Testing of High Voltage Rubber Protective Equipment

a. Rubber gloves shall never be worn inside out or without approved protectors or overgloves. They shall be exchanged at any time they become damaged or the employee to whom they are assigned becomes suspicious of them. Approved protectors or overgloves

shall not be worn except when in use over rubber gloves.

b. Low voltage rubber gloves shall be inspected for defects and shall be given the roll and air test at least once each day while in use, preferably at the beginning of the work period and at any other time when their condition is in doubt.

c. High voltage rubber gloves shall be air and water tested at the beginning of each work period and at any time when the glove's condition is in doubt. The gloves shall be visually examined over their entire inner and outer surface for any defects, i.e., burns, cuts, cracks, or punctures. In addition, the cuffs shall be stretched to detect abrasions or weak spots.

d. When not in use, rubber protective equipment shall be protected from mechanical and chemical damage, and shall always be stored in the containers provided and nothing else placed therein.

e. Rubber blankets and sleeves shall be given a visual roll test to inspect for defects at least once each day while in use, preferably at the beginning of the work period and at any other time when their condition is in doubt.

f. Rubber blankets, when used on the ground, shall be protected from physical damage and moisture by means of a tarpaulin, canvas, or protective mat.

g. Extreme care shall be exercised to avoid puncturing all protective equipment. To avoid corona and ozone damage, rubber protective equipment shall not be allowed to remain in place on energized lines or apparatus overnight or for more than one eight-hour period unless approved by the supervisor in charge.

h. Rubber gloves, sleeves, blankets, used on high voltage (above 600 volts) conductors and equipment shall be dielectrically tested at least once every six months and before being placed into service when received from the manufacturer. This equipment shall be marked with the date the dielectric test was conducted.

i. Rubber gloves used on low voltage (below 600 volts) conductors and equipment shall be dielectrically tested at least once every six months following placement into service when the rubber glove is received from the manufacturer. Rubber gloves shall be marked with the date the dielectric test was conducted.

132. Dielectric Testing of Insulated booms, Bucket Liners and Baker Boards Used for High Voltage (above 7500 volts) rubber Gloving.

Insulated booms and bucket liners, used for high-voltage (above 7500 volts) rubber glove work, shall be dielectrically tested at least once every twelve months. This equipment shall be labeled with the date the dielectric test was conducted. This equipment shall be visually inspected prior to being used for rubber glove work on conductors and equipment above 7500 volts.

133. Safe Supports

No employee, material, or equipment shall be supported on any portion of a tree, pole structure, scaffold, ladder, walkway, or other elevated structure, crane, or derrick, etc., without it first being determined that such support is adequately strong and properly secured.

134. Portable Ladders

a. When employees are working from a portable ladder, the ladder shall be securely placed and held, tied, or otherwise made secure to prevent slipping or falling. Portable rung and cleat ladders shall, where possible, be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder (the length along the ladder between the foot and the top support). All portable ladders, except stepladders, shall be equipped with nonslip bases.

b. Wire truss and portable metal ladders shall not be used in the vicinity of exposed energized circuits. Any such ladders used for authorized purposes shall be legibly marked "Caution — Do Not Use Around Electrical Equipment."

c. Wooden ladders shall not be painted with a pigment-based paint.

d. When using portable ladders to gain access to roofs, landings, underground structures, trenches, excavations, etc., the side rails shall extend a minimum distance of three feet above the point of support.

e. Permanently installed underground structure ladders shall not be used if removed from their designed supportive assembly.

f. Ladders shall not be placed in front of doors opening toward the ladder unless the door is open, locked, or guarded.

g. Employees shall face the ladder and use both hands when climbing or descending.

h. When work from a ladder requires reaching to one side, the center of the employee's body shall not extend beyond the side rails.

i. Employees shall not use ladders with broken or missing steps, broken side rails, or other defects.

j. Employees shall not use benches, boxes, tools, chairs, or other makeshift substitutes as ladders.

k. Employees shall not stand or climb on the topcap or the step below the topcap of stepladders without the use of fall protection.

l. Employees shall not sit on the topcap of stepladders without the use of fall protection.

EXCEPTION: Employees may sit on the topcap of stepladders that are 4 feet or shorter.

135. Tools

a. Only tools in good condition shall be used. Field fabricated tools must be approved by local management.

b. Tools and other materials shall not be left lying in elevated positions, unless protected from falling.

c. Metallic rules shall not be used near exposed energized electrical equipment. Cloth tapes with metal reinforcing shall not be used on the system under any circumstances.

d. Hand Lines

1. When raising or lowering tools or lightweight material, a hand line or hand line with material bag attached thereto shall be used.

2. Hand lines shall be approved nominal 1/2-inch material.

EXCEPTION: At the discretion of the supervisor in charge, a smaller line may be used by the person on the pole to pull lightweight tools and material to themselves.

3. The use of non-conducting hand line sheaves shall be mandatory when working on any structure on which conductors energized 72 kV and below are attached.

e. Powder-Actuated Tools

1. Only qualified employees shall be permitted to operate powder-actuated tools, and they shall be operated in accordance with the manufacturer's instructions.

2. Powder-actuated tools and powder loads shall be in a lockable container and stored in a safe place when not in use and shall be accessible only to qualified employees.

136. Current Transformer Secondaries

Before energizing any current transformer, it shall be known that the secondary circuit is closed. If the primary voltage exceeds 600 volts the secondary shall also be grounded. Before working on instruments or other devices in a current transformer secondary circuit, the instruments or devices shall be short-circuited by jumpers or approved test switches, so that the current transformer secondary circuit cannot be opened while working on the instruments or devices connected thereto. The ground lead or the secondary circuit of an energized current transformer shall never be disconnected or opened.

137. Edison Communication Open Wire Lines and Equipment

a. Rubber gloves must be worn when working on all Edison communication open wire lines or equipment unless the employee is adequately insulated from the ground and other conductors, or positively knows the line to be shorted and grounded. (This does not apply to communication equipment on the station side of telephone insulating transformers or other protection equipment on the communication terminal rack.)

b. Telephone fuses must not be removed or replaced except by the use of suitable insulated tools or rubber gloves, unless the fuse block is first entirely disconnected from the line or lines.

c. Work on telephone-type alarm circuits, including pallet switches, rectifiers, and all connections, shall be done in accordance with Rules 138 a. and b.

138. Edison Communication Cable

a. Work on telephone-type alarm circuits, including pallet switches, rectifiers, and all connections, shall be done in accordance with Rules 137 a. and b.

b. Rubber gloves shall be worn when connecting or removing any station or remote shield grounds and neutral or driven grounds from the messenger. The field testman shall wear rubber gloves when in contact with a grounded cable shield.

c. When in contact with a cable shield in communication terminal cabinets, rubber gloves or approved insulated rubber mats shall be used. Contact with any portion of the telephone terminal rack and/or foreign grounds shall be avoided.

139. Breaking Pressure Connections

Before removing a valve bonnet or stuffing box gland, breaking a flanged joint, removing manhole covers, or other pressure connection, the bolts, nuts, or other fasteners shall first be loosened, but not removed, and special care exercised to make sure that pressure is released or does not exist.

140. Chain Saws

a. Employees required to use chain saws shall be trained in their use and application.

b. Only approved chain saws shall be used from elevated positions on erected poles. When air or hydraulic chain saws are not available, a gasoline chain saw may be used, provided it does not weigh more than 15 pounds (gross weight).

c. Chain saws shall not be attached to or suspended from a body belt or harness.

d. Chain saws shall be secured with a separate line at all times when being used from an elevated position.

e. When a chain saw is being used, the operator shall grip the saw with both hands during the entire cutting operation.

f. The saw engine shall be stopped when working on any part of the chain or cutting bar.

141. Grounding

a. Unless otherwise performing work with live line or other approved insulated tools, Overhead, Underground or Station conductors and equipment normally operated at a voltage in excess of 600 volts shall not be worked on until de-energized and the normally energized parts have been tested as de-energized with an approved device for indication of voltage and all conductors have been short circuited and grounded according to business unit procedures. Backfeed from transformers, energized high-voltage conductors which cross over a de-energized conductor and unprotected energized

conductors which cross under a de-energized conductor shall be considered possible sources of supply. This shall not preclude the removal of grounds for test purposes. When the work on such de-energized conductors involves the wiping or testing of insulators only, high voltage conductors crossing under such de-energized conductors need not be considered a possible source of supply.

b. Only approved grounding and jumper equipment shall be used. This equipment shall only be used for grounding purposes. Portable grounding devices shall be secured to permanently grounded objects at the location selected for grounding in the following order of priority:

   1 Station ground

   2. 4-wire multi-grounded primary neutral

   3. Steel structures

   4. Anchor rods

   If none of the foregoing are available, an approved temporary ground rod shall be used. An approved testing device shall be used to prove conductors or equipment de-energized before grounding. The conductors or equipment shall be grounded and short circuited with approved grounding devices. Grounding devices shall be applied and removed with live line tools. When the primary neutral conductor is used as the grounding medium, grounding devices must be connected to an additional approved ground.

   NOTE: A multi-grounded primary neutral, as opposed to a "floating" neutral, is defined as a neutral conductor on a primary circuit, that has grounds attached to it, at intervals of up to 1200 feet. If a multi-grounded primary neutral has grounds attached to it at intervals greater than 1200 feet, it should be reported, however it shall still be considered a priority for grounding purposes, over steel structures, anchor rods, and driven grounds.

c. The grounding devices shall first be connected to a ground before being brought in contact with any conductor to be grounded. When being removed, they shall be removed from all conductors before being disconnected from ground. No employee shall handle any conductive portion of the grounding device while it is being installed or removed from the conductors, except when using live line tools.

d. The employee applying the grounding device shall determine that all persons are a safe distance from any portion of the grounding device before contacting the conductor with the grounding equipment.

e. Grounds shall be installed so that at least one set is visible to one member of the crew, unless one of the grounding devices is accessible only to authorized persons.

f. Grounding devices shall be placed so that employees cannot make accidental contact between the grounding devices and unprotected energized conductors.

g. When working on new lines or equipment under construction or on existing de-energized conductors or equipment, jumpers shall be installed to ensure that no potential difference exists between the equipment being worked upon and any grounded conductors or equipment which might be contacted while the work is in progress. On grounded steel structures, a personal ground shall be installed between each de-energized conductor being worked upon and the steel structure. Before opening or closing any conductor that may be exposed to a difference of potential or that has been grounded to a primary neutral, approved jumpers shall be in place across the point to be opened or closed to ensure continuity of the conductor. When splicing overhead conductors at ground level that are exposed to a difference of potential, an EPZ mat shall be used, or a ground shall be installed on each side and within ten feet of the working area. The two ends being spliced shall be bonded together with an approved jumper.

h. When it is necessary for employees of other Business Units to work in substations or generating stations on lines or equipment where portable grounds are required they shall be supplied by the substation or generating station.

i. When work is to be done on one de-energized circuit of a multiple circuit line at the same level and the circuits are separately bonded, tests shall be made to determine that no appreciable difference of potential exists between the grounded conductor and the bond of the circuit to be worked upon.

j. When working on or climbing through energized multiple circuits that are commonly bonded and it is impossible to avoid personal contact with the bond, the bond shall first be grounded before the lineman climbs through or works on the circuit.

k. When work is to be done or contact made on the bond or metal fixture of either a Dreyfuss or squirrel cage fixture supporting energized conductors, it must be done with live line tools or the fixture must be grounded. If the bond wire is #4 copper and is exposed so it can be inspected, only one fixture need be grounded. If not, approved jumpers are required between fixtures.

   NOTE: Nothing in this rule shall prohibit working on conductors with approved insulated tools or equipment.

l. Station ground disconnects shall not be considered for use as approved personal grounding devices. Only approved grounding devices as outlined in this rule shall be used for the protection of personnel.

142. Hearing Conservation

a. Employees shall wear hearing protection in areas where required or where the noise level and the time involved exceeds the levels established by the state or federal OSHA.

   1. Generating stations and hydro powerhouses shall develop a site-specific Hearing Conservation Program Implementation Plan. Business Units

that dispatch workers from a work location, e.g., the Transmission and Distribution Business Unit (TDBU), shall develop a business unit Hearing Conservation Program Implementation Plan to cover any employees required to be in the Hearing Conservation Program.

b. Employees shall be aware of areas with high noise levels where hearing protection is required. When in doubt — hearing protection shall be worn.

c. Only approved hearing protection shall be used. The employee shall use protection provided and exercise due care to keep protection in a sanitary condition.

d. A copy of the corporate Hearing Conservation Program and site specific Hearing Conservation Program Implementation Plan shall be maintained at each site.

   1. Corporate EH&S has developed guidance for implementing the requirements of this program. Information regarding the SCE Hearing Conservation Program can be found on the Corporate Environmental Health & Safety Portal.

143. Confined Spaces and Permit Required Confined Space

Other Confined Space (Underground Utility Vaults). (See APM Rule 301)

a. Confined Space — A confined space is defined as a space that has all three of the following:

   1. Is large enough that an employee can bodily enter; and,
   2. Has limited openings for entry or exit; and,
   3. Is not designed for continuous employee occupancy.

b. Permit Required Confined Space (PRCS) — A Permit Required Confined Space is a confined space that meets any of the following:

   1. Contains or has a potential to contain a hazardous atmosphere; or,
   2. Contains a material with the potential to engulf an entrant; or,
   3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor that slopes downward and tapers to a smaller cross-section; or,
   4. Contains any other serious safety or health hazard.

c. Atmospheric Testing & Monitoring

   1. Test for the presence of combustible gases, toxic gases, and oxygen deficiency and/or enrichment shall be made with approved testing devices immediately prior to an employee entering these space(s). Where practical, initial tests shall be made before access doors are opened or covers removed.
   2. During the time such space is occupied atmospheric monitoring shall be at intervals not to exceed 4 hours. Continuous monitoring is a best practice. Re-logging of atmospheric monitoring results shall be made at intervals frequent enough to assure a safe atmosphere, but are not to exceed four hours. Where normal ventilation is not adequate to provide a safe atmosphere, suitable temporary ventilation to ensure employee safety shall be provided.

      Ensure that:

      a. The intake is away from traffic to avoid vehicle exhaust fumes.
      b. If the ventilating equipment is gas-powered, the motor exhaust is not being drawn into the air intake.
      c. The ventilation equipment's intake is at least 5 feet away from the space entry.

   3. All test results shall be recorded in an approved inspection log and retained by the work location for one (1) year
   4. Written, understandable operating and rescue procedures shall be developed and provided to affected employees by each work location requiring employees to enter into and work in a confined space, If entry into a confined space in which a dangerous air contamination and/or oxygen deficiency exists, the following shall be done prior to entry:

      a. Appropriate approved protective equipment shall be provided and worn.
      b. Rescue procedures and equipment shall be developed and provided.
      c. At each location, a qualified employee shall evaluate the workplace to determine if any confined spaces are permit-required confined spaces (permit spaces).
      d. Employees exposed to a permit space shall be informed of the existence and location of the danger posed by the permit spaces.
      e. If employees will not be allowed to enter permit spaces, effective measures shall be taken to prevent employees from entering the permit space.
      f. If employees will enter permit spaces, a written permit program shall be developed and implemented by each location which contains permit space(s).

NOTE: If the development of dangerous air is imminent or should atmospheric monitoring test results indicate the development of dangerous air, evacuate the space, permit no one to enter the space, and notify Corporate or Business Unit Safety.

The SCE Confined Spaces Program (EHS-CS-PG-0017) is an integral part of the Corporate EH&S management system. This program provides the requirements for identifying, evaluating, and working in non-permit and permit-required confined spaces. For additional guidance,

you must refer to the Corporate Environmental Health and Safety Portal.

144. Powered Industrial Trucks

a. Each supervisor shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this rule.

b. Training shall be consistent with CCR, Title 8, General Industry Safety Orders, 3668.

c. An evaluation of each powered industrial truck operator's performance shall be conducted and documented at least once every three years.

d. Refresher training and evaluation in relevant topics shall be provided to the operator when:

   1. The operator has been observed to operate the vehicle in an unsafe manner;
   2. The operator has been involved in an accident or near-miss incident;
   3. The operator has received an evaluation that reveals that the operator is not operating the truck safely;
   4. The operator is assigned to drive a different type of truck; or
   5. A condition in the workplace changes in a manner that could affect safe operation of the truck.

e. Employees operating industrial trucks shall follow all posted operating rules, in accordance with CCR, Title 8, General Industry Safety Orders, 3664, along with any site-specific procedures established by the work location.

145. Helicopter Operation

Only personnel qualified in the specific helicopter work method operation conducted by Aircraft Operations shall participate in the operation. Helicopter work methods include: external loads, Helicopter Manlift, line stringing, rigging, and pole sets.

All equipment used in helicopter work method operations shall be approved and inspected prior to each operation.

a. Personal Transport

   1. Personnel shall not board or depart from a helicopter with the rotor turning or enter the area below the rotor's arc, until authorization is received from the pilot. Entry and departure from this area shall be from the front of the aircraft only.
   2. Personnel shall not board or depart from an airborne helicopter.

      EXCEPTION: Allowed when operations are conducted under Section d. (Helicopter Manlift Operations) of this rule.

b. External Load Operations

   1. Only personnel who have received a special course of instruction from the Air Operations Division or their qualified designee shall be permitted to work below a hovering helicopter.
   2. The job shall be planned to minimize the time spent by personnel below a hovering helicopter.
   3. Personnel shall not enter the area below the blades of the main rotor of a hovering helicopter until authorized by the pilot and with the approval of the supervisor in charge.
   4. The job shall be planned so that the number of personnel directly assigned to the helicopter operation shall be kept to a minimum. Persons not directly assigned or connected with the job shall not be permitted within 150 feet of the helicopter touchdown and lift-off location (passing automobiles on adjacent roads are excluded from this requirement).
   5. Personnel shall not stand or pass under a load suspended from a hovering helicopter.
   6. When utilizing hand signals, helicopter pilots shall receive hand signals from only one person during operations. Only qualified and authorized employees shall give signals. Personnel giving signals shall be readily identifiable.
   7. When working in the vicinity of hovering helicopters, personnel shall wear dust goggles; hard hats shall be secured by chin straps.

c. Aerial Patrol

   All personnel onboard a helicopter during patrols shall have completed Aircraft Operations' patrol training.

   EXCEPTION: Allowed with written waiver from Manager of Aircraft Operations or designee.

   1. Pilots and patrol personnel shall tailboard the mission to be flown, the patrol personnel's knowledge of the mission, known hazards to flight, responsibilities of the crew, and response to emergency situations.
   2. When expected to operate for extended periods at low altitudes and low speeds, personnel shall not wear clothing made of, or which contains, synthetic fabrics such as acetate, nylon, polyester, or rayon that have not been treated for flame retardancy. In addition, a company-approved fire retardant shirt, fire retardant coveralls, or a fire retardant rain suit and a protective flight helmet shall be worn.

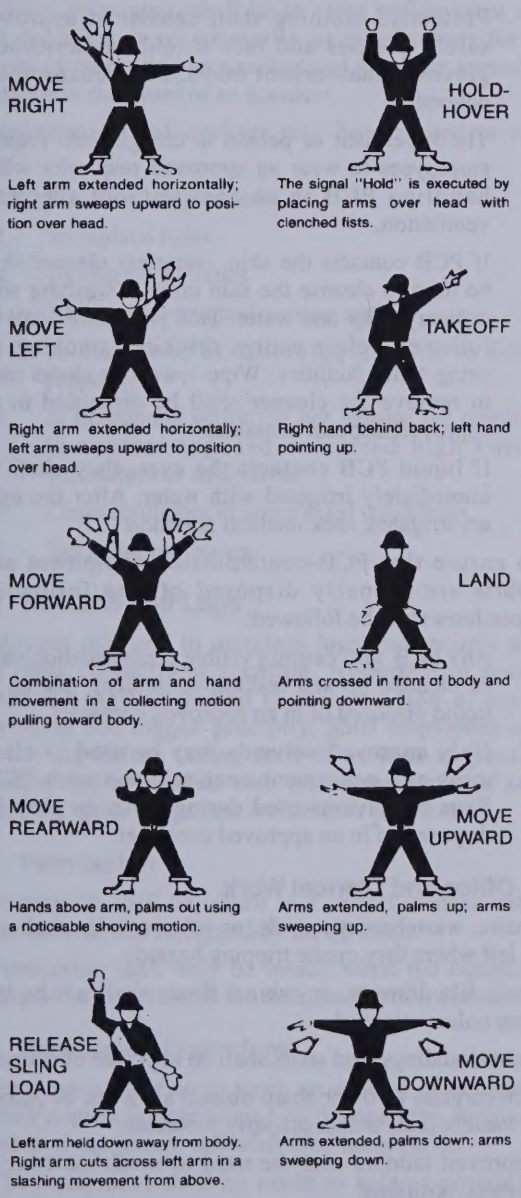
d. Helicopter Manlift (Human External Cargo — HEC)

   1. TDBU and Aircraft Operations procedures directing helicopter Manlift operations shall be strictly followed.
   2. All personnel participating in a Helicopter Manlift operation shall be qualified or accompanied by qualified personnel in accordance with applicable procedures.

3. All equipment used in Helicopter Manlift operations shall be approved and inspected by qualified personnel prior to each operation.

NOTE: A hovering helicopter is defined as one which is airborne and virtually motionless.

HELICOPTER HAND SIGNALS


MOVE RIGHT
Left arm extended horizontally; right arm sweeps upward to position over head.
HOLD-HOVER
The signal "Hold" is executed by placing arms over head with clenched fists.
MOVE LEFT
Right arm extended horizontally; left arm sweeps upward to position over head.
TAKEOFF
Right hand behind back; left hand pointing up.
MOVE FORWARD
Combination of arm and hand movement in a collecting motion pulling toward body.
LAND
Arms crossed in front of body and pointing downward.
MOVE REARWARD
Hands above arm, palms out using a noticeable shoving motion.
MOVE UPWARD
Arms extended, palms up; arms sweeping up.
RELEASE SLING LOAD
Left arm held down away from body. Right arm cuts across left arm in a slashing movement from above.
MOVE DOWNWARD
Arms extended, palms down; arms sweeping down.

146. Trenches and Excavations

a. Before entering any trench or excavation, an examination by a qualified person shall be conducted to determine that no recognized conditions exist which could expose employees to injuries from possible ground movement during such time that the trench or excavation is occupied. No trench or excavation five feet or more in depth shall be entered until it has been effectively guarded by a shoring system, benching or sloping of the ground, 3/4 horizontal to 1 vertical, or other equivalent means. Excavated material or equipment shall not be placed closer than two feet from the edge of trenches or excavations.

b. Protection for employees who work in trenches or excavations less than five feet in depth shall also be provided when examination by a qualified person indicates that hazardous ground movement may occur.

c. All trenches or excavations four feet or more in depth shall be ascended and descended with ladders unless it is sloped or stepped. There shall be a ladder no more than 25 feet away from any employee occupying the trench or excavation, and it shall extend at least three feet out of the trench or excavation.

147. Working Distance

a. No employee shall approach or take any conductive object, except with approved devices, closer to unprotected energized parts than shown in the following table:

Nominal Voltage Range (Phase to Phase) Kilovolts	Minimum Working and Clear Live Line Tool Distance Phase to Ground Exposure
above 0.6 to 15	2 feet 1 inch
above 15 to 36	2 feet 4 inches
above 36 to 46	2 feet 7 inches
above 46 to 72.5	3 feet 0 inches
above 72.5 to 121	3 feet 4 inches
above 121 to 145	3 feet 7 inches
above 145 to 169	4 feet 0 inches
above 169 to 242	5 feet 3 inches
above 242 to 362	8 feet 6 inches
above 362 to 552	11 feet 3 inches
above 552 to 765	15 feet 0 inches

NOTE: Above 242 kV the minimum working distance and the minimum clear live line tool distance shall be permitted to be reduced provided that such distances are not less than the shortest distance between the energized part and a grounded surface.

b. Approach distances may be reduced, provided adequate approved protective devices are used. Such protection shall be applied and removed with approved insulating devices.

c. Contact shall not be made with protective devices on conductors energized above 7,500 volts except with live line tools.

EXCEPTION: Employees certified in rubber gloving of conductors energized between 7,500 volts to 17 kV may contact protective devices up to 17 kV while wearing rubber gloves rated for the voltage and while utilizing "insulate and isolate" work practices.

148. Reserved

149. Backfeed

a. Before contacting the high-voltage (rated in excess of 600 volts) side of a de-energized transformer(s), or conductors connected thereto, all possible sources of backfeed shall be eliminated by disconnecting with an opening (opening primary or secondary jumpers, fuses, primary switches, cutouts, etc.), or by grounding and short circuiting the low or high-voltage side.

"PERSONNEL AT WORK — Do Not Energize" signs shall be placed at all isolation points before contacting de-energized high-voltage conductors or equipment, or they shall be considered energized, and worked in accordance with established rules. Signs may be removed only by the person placing them.

EXCEPTION: Where the person placing the sign has left the premises or is otherwise unavailable to remove the sign, the supervisor in charge may authorize removal of the sign after verification that all personnel are clear of all conductors and equipment.

b. Before contacting de-energized low-voltage conductors or equipment, all possible sources shall be eliminated or short circuited; or they shall be considered energized and worked on in accordance with established rules.

c. When short circuiting at the customer panel, shunts shall be connected to each phase, the neutral, and the customer ground.

150. "PERSONNEL AT WORK — Do Not Energize" Signs

a. "PERSONNEL AT WORK — Do Not Energize" signs shall be placed at all isolation points before contacting de-energized low-voltage conductors or equipment, or they shall be considered energized, and worked in accordance with established rules.

EXCEPTION: This rule shall not apply in cases where the isolation points are in clear view of the workers or a qualified observer during the entire course of the job.

b. Signs may be removed only by the person placing them.

EXCEPTION: Where the person placing the sign has left the premises or is otherwise unavailable to remove the sign, the supervisor in charge may authorize removal of the sign after verification that it is safe to do so.

151. Reserved

152. Asbestos and Man-made Mineral Fibers

Procedures addressing the handling and removal of asbestos and man-made mineral fibers and the required employee protective equipment are contained in the SCE Asbestos and Man-made Mineral Fiber Information Manual (SCE 40-40).

153. Polychlorinated Biphenyl (PCB) Handling and Disposal

a. The handling of PCB materials shall be in accordance with the following procedures to ensure that allowable exposure limits are not exceeded and environmental contamination does not occur.

1. Employees shall wear appropriate protective clothing when contact with PCB is unavoidable. Protective clothing shall consist of approved safety goggles and face shield, nonabsorbent gloves, nonabsorbent boots, and nonabsorbent coveralls.
2. The supervisor or person in charge shall require employees to wear an approved respirator when handling PCB in an area without adequate ventilation.
3. If PCB contacts the skin, waterless cleaner shall be used to cleanse the skin prior to washing with ordinary soap and water. This procedure shall be followed before eating, drinking, smoking, or using toilet facilities. Wipe towels or cloths used to remove the cleaner shall be discarded in an approved disposal container.
4. If liquid PCB contacts the eyes, they shall be immediately irrigated with water. After the eyes are irrigated, seek medical attention.

b. To ensure that PCB-contaminated equipment and debris are properly disposed of, the following procedures shall be followed:

1. Any PCB spill causing visible contamination shall be cleaned up and leaking equipment, debris, or liquid disposed of in an approved container.
2. Only approved solvents may be used to clean tools and equipment contaminated with PCB. Rags or solvents used during clean up shall be disposed of in an approved container.

154. Office and Clerical Work

a. Chairs, wastebaskets, cords, or other articles shall not be left where they create tripping hazards.

b. Desk, file drawers, or cabinet doors shall not be left open unless attended.

c. Floors, landings, and stairs shall be kept free of debris.

d. Broken glass or other sharp objects shall not be placed in wastebaskets unless properly protected.

e. Approved ladders shall be used to reach material in elevated positions.

f. Paper cutter blades shall be lowered after use and latched if so equipped.

g. Bottom file cabinet drawers shall be filled prior to top drawers. Top drawers shall not be overloaded in a manner which would cause the file cabinet to tip over when opened. Only one file drawer of the file cabinet shall be open at the same time.

h. Electrical outlets shall not be overloaded.

155. Qualified Electrical Workers

Only qualified electrical workers or employees in training under the supervision or instruction of a qualified electrical worker shall be assigned to work on conductors or equipment energized in excess of 600 volts. Except as outlined below, when work is being performed on exposed conductors or exposed parts of equipment energized in excess of 600 volts, a second qualified electrical worker or employee in training, shall be in close proximity at each work location to act primarily as an observer for the purpose of preventing an accident and to render immediate assistance in the event of an accident.

Qualified electrical workers may be assigned to work alone:

1. When clearing trouble.
2. To replace fuses.
3. To operate switches.
4. To make current and voltage tests.
5. In emergencies involving hazards to life or property.
6. In operations which do not require the employee to contact exposed energized high voltage conductors or equipment.
7. Clean insulators in uncrowded conditions.
8. Hot insulator testing.

156. Records and Logs

Employees required to maintain logs and records shall keep them current and accurate. Abnormal or special conditions shall be called to the attention of proper supervision and logged promptly. Shift employees shall read the log before taking shift or as soon as possible thereafter, and be familiar with the current status of lines, equipment, units, or systems within their jurisdiction.

157. Permission

a. Permission shall be issued in a formal manner stating the hazards and so logged by the operator.

b. Permission shall only be issued when the equipment cannot be de-activated for the issuance of a clearance.

158. Permission Procedure

a. Employees desiring to work on a piece of equipment shall request the permission of the operator, stating the piece of equipment and what they intend to do.

b. The equipment shall be made as safe as possible to work on to accomplish the desired work. When possible, "Personnel at Work" tags shall be hung at points used to isolate the equipment.

c. The status and hazards shall be stated by the operator and the person desiring the permission shall repeat the same. Special attention shall be given that automatic equipment is made nonautomatic, where possible, before permission is granted.

d. The status of the equipment and the hazards shall be logged by the operator.

e. The permission shall be entered in the log.

f. The permission shall be signed by the operator and by the person accepting the permission, when possible. When it is not practical for the employee to sign the log, all communications shall be clear and the permission formal. The person's name shall be written by the operator and counter-signed as soon as the person is available.

g. When the work is completed, the permission shall be released in a formal manner stating the status of the equipment, and all work completed.

159. Abnormal Conditions

Employees shall monitor affected equipment to prevent potential hazard to personnel and equipment. Employees shall be informed of, and safeguards shall be used around, hazardous areas and equipment.

160. Welding, Metallizing, Soldering, and Use of Open Flames

a. Open flames shall not be brought near to, nor welding processes, brazing, flame cutting, or soldering done on any empty container, tank, or other vessel which has previously contained a flammable or explosive substance, except pipe lines which are covered in Rule 160 g., until one or more of the following precautions as required for each job have been taken to prevent explosion or fire:

   1. Clean with water, steam, or a caustic solution.
   2. Descale using non-sparking tools.
   3. Remove residue or other flammable material from area of work to be done, or provide an observer as required, equipped with proper fire extinguishing devices.
   4. Fill container or vessel with water or inert gas such as carbon dioxide or nitrogen.
   5. Provide ample venting to remove explosive mixtures.
   6. Test for explosive atmosphere, using an approved test device.

b. Welding processes may be performed on the outside surface of a container, tank, or other vessel containing a liquid flammable material, except pipe lines which are covered in Rule 160 g., provided the work is done not less than six inches below the level of the liquid, and there is little likelihood of burning through the vessel wall. Adequate venting shall be provided as required. This does not apply to LPG vessels.

c. Welding processes may be performed on the top surface of a vessel which is partially filled with a liquid flammable material which cannot be removed, only after the area above the liquid is filled with steam, carbon dioxide, or other inert gas and the vessel is held

under positive pressure. This will not apply to LPG vessels or for repairing leaks in the vessel.

d. Welding processes, flame cutting, brazing, metallizing, soldering, and the use of open flames on vessels subject to possible ignition of contents shall be done in accordance with approved procedures by fully qualified personnel who shall observe the following additional precautions:
   1. Keep away from vessel openings as far as possible.
   2. Provide suitable fire protection equipment adjacent to the work. Fire Protection rules and information will be covered by the new Fire Information, Rules, and Education Manual.
   3. Hazardous areas shall be designated by signs and protected by approved barricades as required.

e. It shall be the responsibility of the welder to see that, where practicable, screens are properly placed to prevent eye injury to fellow employees and on-lookers. Helpers shall wear suitable eye protection when assisting in welding.

f. Whenever lead, cadmium, galvanized, or other toxic fume-producing material is welded, burned, or otherwise heated to such a degree that fumes from the metal or its fluxes are generated, the persons performing the work shall be protected by approved respiratory equipment. If respiratory equipment is required to protect the persons performing the operation, the following additional precautions shall be observed:
   1. Sufficient ventilation shall be provided for the protection of others to prevent accumulation of harmful quantities of fumes in the work area; or
   2. The operation shall be isolated; or
   3. The work shall be performed outdoors, in such a location that fumes will not enter any building in harmful quantities.

g. When performing any repairs or alterations on chemical or fuel piping, a qualified person shall be accountable for the work to see that all proper precautions to prevent explosion or fire are observed and all safety rules and procedures applicable to the use of special apparatus to effect such repairs or alterations are followed.

h. When burning into a pipe or closed vessel, stand on the opposite side or in the clear. Where there is danger of causing a fire in the area during a welding operation, an employee shall stand fire watch.

i. When welding, cutting, or heating operations are being performed, suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.

j. Welding or cutting fuel lines is permissible only after being isolated, drained, and purged or otherwise made safe to work on or when approved detailed written procedure for the specific job has been prepared by the supervisor in charge.

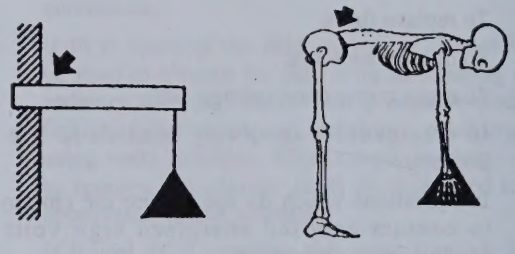
161. Open Flames in Battery Rooms

The use of open flames in battery rooms is prohibited except under the direct supervision of qualified and experienced personnel, and then only after the room has been well ventilated.

162. Material Handling

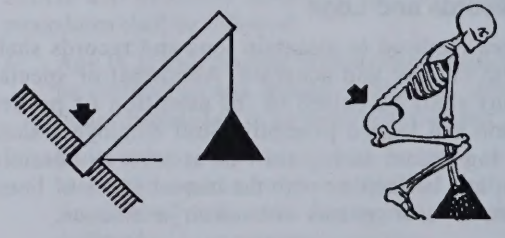
a. When lifting, take a firm grip, secure good footing, place the feet a comfortable distance apart, bend the knees, and lift with the leg muscles.

Figure 1. INCORRECT LIFT



Arrows indicate points of greatest strain

Figure 2. CORRECT LIFT



Arrows indicate points of greatest strain.

b. Secure help when needed. Use cranes or hoists for lifting heavy loads. Keep out from under suspended loads.

c. Use gloves or hand pads as required when handling materials.

d. Never carry a load that obstructs the vision.

e. No material or tools of any sort shall be carried on the shoulder when working in proximity to exposed energized equipment. Long material, including lumber, shall be carried in a horizontal position. Caution shall be exercised to prevent any material or tools from accidentally contacting energized conductors or equipment.

163. Packing, Unpacking, Storage, Loading, and Unloading of Materials

a. Nail points, ends of wires, or bands shall not be left exposed when packing or unpacking boxes, crates, barrels, or other containers.

b. Nails shall be removed from loose lumber, the points bent down, or the lumber shall be disposed of so it will not become a hazard.

c. Sharp or pointed articles shall be so stored as to prevent persons from coming in contact with the sharp edges and points.

d. Care shall be exercised when packing or unpacking glassware, porcelain, and other fragile objects which may have sharp edges, and gloves or other protective hand equipment should be used.

e. Loads shall not be handled from the street side of a vehicle if it can be avoided.

f. Special regulations and instructions governing the loading and unloading of poles, pipes, etc., shall be strictly observed in every case.

164. Scaffolds

a. Erection or dismantling of scaffolds shall be performed under the supervision and direction of a qualified person.

b. Only approved scaffolding and planking shall be used. Scaffold planks shall not be used for any other purpose. Planking shall be inspected before use.

c. Scaffolding shall be of sufficient strength and rigidity to support the weight of personnel and material to which it will be subjected.

d. All scaffold work levels 30" or higher above the ground or floor shall have guard rail protection.

e. All scaffold work levels 6 feet or higher above the ground or floor shall have a toe board at locations where persons are required to work or pass under the scaffold.

f. Ladders or stairways on scaffolds for access and egress shall be affixed or built into the scaffolds.

165. Unloading Poles From Trucks, Trailers, and Dollies

a. Poles shall be unloaded from trucks, trailers, and dollies by the following methods as circumstances and traffic conditions permit:

   1. By means of a boom, mobile-type crane, or skids.
   2. By snaking poles from the end of a load.
   3. By lowering of poles with lines only where conditions require this method.

b. Dumping an entire load from a dolly or trailer is prohibited.

c. When rolling a pole from a load, a bull line or lines shall be used to control its descent. Dropping poles over the side of a truck, trailer, or dolly is prohibited.

d. Employees shall not stand on the unloading side of transporting equipment while unloading a pole.

e. When unloading poles with skids or lines, the load binders and bolster stakes shall not be removed until the skids or lines are in place, and the load binders shall be removed from the side opposite the unloading side when possible.

f. When unloading poles which have been secured with tie wire or straps, only the binding for the layer being unloaded shall be removed.

g. A load shall be properly secured before moving from one location to another.

166. Unloading Poles From Railroad Cars and Vendors' Trucks

a. Before Unloading:

   1. The car shall be prevented from moving by chocking and setting the brakes.
   2. Car stakes shall be inspected to see that none are broken. If broken stakes are found, the load shall be made secure by placing a minimum of two safety stakes on each side in undamaged stake pockets or by binding the load with a winch line.
   3. Stake pockets shall be inspected for broken or loosened bolts, etc. If stake pockets are found to be damaged, new stakes shall be placed in adjacent undamaged pockets.
   4. Binding shall be inspected for broken intermediate tie wires or straps. If these are found to be broken, employees shall not be allowed on top of the load until it has been secured by an approved method.

b. Unloading:

   1. Poles shall be unloaded with crane, derrick, or by other methods approved by the work location management.
   2. Only the binders for the layers being unloaded shall be cut.
   3. When unloading with a sling, employees shall not be permitted to reach under suspended loads.
   4. Employees guiding poles suspended from a hoisting device shall do so only at the ends of the suspended load.

167. Telecommunication Aerial Devices, Operating Procedures, Utilized for Towering Work

a. An aerial device truck shall not be moved when the boom is elevated in a working position with an employee in the platform except when all of the following are complied with:

   1. The equipment is specifically designed for this type of operation in accordance with the provisions of ANSI/SIA A92.2-1990, American National Standard for Vehicle-Mounted Elevating and Rotating Aerial Devices.
   2. All controls and signaling devices are tested and are in good operating condition.
   3. An effective communication system shall be maintained at all times between the platform operator and where applicable, the vehicle

operator. The communication system shall be turned on and tested prior to the platform operator going aloft.

4. The route to be traveled is surveyed immediately prior to the work trip, checking for overhead obstructions, traffic, holes in the pavement, ground or shoulder, ditches, slopes, etc. For areas other than paved, a survey should be made on foot.
5. The speed of the vehicle shall be in accordance with the manufacture's (towering) recommendations. Under no circumstances will towering be permitted to exceed three (3) miles per hour.
6. Only one employee is in the platform.
7. Both the driver and the elevated employee have been specifically trained for this type of work (towering) in accordance with the manufacturer's recommendations.
8. A "Men Working Sign" is placed at the beginning of the work location.
9. When the work is completed at a work location and the vehicle is to be moved more than two (2) spans to another work location, the employee in the platform shall stow the boom in the cradle and ride to the next work location in the cab with the vehicle operator.
10. When the work is completed at a work location and the platform operator does not need to be in an elevated position to travel less than two (2) spans to another work location, the employee in the platform shall lower the boom to a horizontal position, positioning the platform behind the truck prior to the vehicle operator moving the vehicle.

b. Lift controls shall be tested in accordance with the manufacturers recommendations prior to use to determine that such controls are in safe working condition and documented in the appropriate drivers log.

c. Only authorized and trained employees shall operate aerial devices utilized for towering.

d. Belting off to an adjacent pole, structure, or equipment, while working from an aerial device shall not be permitted.

e. Employee shall not sit or climb on the edge of the platform or use planks, ladders, or other devices to gain greater working height.

f. When elevating personnel in the platform with the vehicle stationary, the braking system shall be set.

g. Provided they can be safely installed, wheel chocks shall be installed prior to using an aerial device on an incline.

h. Climbers shall not be worn while performing work from an aerial device.

i. When the platform operator is in the platform, the driver shall not leave the cab of the vehicle unless the engine is turned off and the brakes set.

j. Lower level controls shall not be operated unless permission has been obtained from the employee in the basket, except in case of emergency.

k. An employee, while in an elevated aerial device, shall be secured to the platform through the use of a body harness equipped with a lanyard.

l. Cell phones shall not be utilized when working or standing in a platform.

m. AM/FM radios, cassette players and c.d. players shall be turned off in the cab of the truck when the platform is occupied.

n. Boom and platform load limits specified by the manufacturer shall not be exceeded.

Section 200
T & D OVERHEAD RULES

201. Reserved

202. Testing of Wood Poles

a. Prior to climbing or working on a wood pole, a thorough visual and sounding inspection for evidence of damage caused by vehicles, decay, or insect infestation shall be conducted. The sounding shall be from groundline to six feet above groundline using a hammer or other device to locate internal decay pockets.

b. If the pole is in doubt, the pole shall be tested as follows:

   1. The inspection borings (9/16-inch hole) shall be drilled 90 degrees apart. The first boring should be at least 12 inches below groundline, the second should be at groundline. Drill downward at a 45 degree angle and extend past the center of the pole, but not nearer than 2 inches of the opposite side. The inspection borings should be adjacent to the largest check or other area indicating internal decay. When the pole is set in pavement the above test shall be conducted by drilling the first hole at ground level, 12 inches above ground level for the second boring and 90 degrees apart.
   2. Each hole shall be probed with a shell thickness indicator to determine presence and extent of decay.
   3. Boring holes shall be plugged with a 5/8 inch treated wood dowel.

c. For the purpose of this rule, a pole stub shall be considered part of the pole and tested accordingly.

NOTE: For further reference see Rules 209 and 210.

203. Bonds

In addition to bond wires, the term bond, as used in this rule, refers to metal crossarms, metal insulator pins, space bolts, or any other hardware which is attached to insulators supporting energized conductors.

a. Prior to contacting the bonds of energized circuits, the bond shall be grounded or worked with live line tools. Only live line tools shall be used on the bonds of circuits above 20 kV where the conductors are supported on pin or post type insulators.

EXCEPTIONS:

   1. Rubber gloves may be used on the bonds of circuits 20 kV or less, only when the integrity of the insulators have been inspected and found to be in good condition.
   2. Circuits above 20 kV, where the circuit consists of all suspension type insulators, rubber gloves may be used on the bonds, only when the integrity of the insulators have been inspected and found to be in good condition.

b. Every insulator on the circuit shall be checked visually for breaks and cracks on the pole being worked on before contact is made with, or work is done on, the bonds of energized circuits.

   1. If a pin or post type insulator is faulty or more than 30% of the insulators in a string of suspension insulators are faulty, the conductor must be cleared, or de-energized before any work is done on the bond.
   2. If conditions are such that it is impracticable to clear or de-energize the conductors, the bond shall be worked with live line tools.

c. The following procedures shall be followed if the visual inspection indicates faulty insulators:

   1. If any insulator is suspected to be faulty on circuits supported on single unit insulators, the conductor must be cleared before any work is done on the bond.
   2. When circuits are supported on multiple unit insulators, at least 70% of the insulators in each string must be in good condition or the conductor must be cleared before any work is done on the bond.

204. Testing Lines and Equipment

Electrical equipment and lines shall always be considered as energized unless they are positively known to be de-energized. Before starting work, preliminary inspection or test shall be made to determine what conditions exist.

205. Pole Top Apparatus

a. All cutouts shall be operated with a switch stick or other approved device.

b. Contact shall not be made with transformers, capacitors, regulators, oil switches, bonds, or other pole top apparatus except when worked upon with approved devices.

c. Where work is to be performed at the location of pole top air break switches energized in excess of 7500 volts, the hardware or base of these switches shall be proved by test to be de-energized immediately preceding each period of work at that location.

d. Automated pole top switches shall be made local and non-automatic/solid before working in proximity to the primary level or above these automated switches. The switching center shall be notified whenever the status of an automated switch is changed.

206. Digging Holes

a. Employees shall stay "in the clear" of the revolving auger of the pole hole digger.

b. Holes dug in advance of line construction shall be covered by a suitable hole cover. The hole cover shall in turn be anchored by a covering of dirt or other suitable means.

207. Energized Lines

a. The term "energized lines," as used in Rule 207, is defined as any conductor energized above 300 volts. Neutral conductors of such circuits, series street light conductors, and all current-carrying parts thereof shall also be considered "energized lines." De-energized conductors which have been grounded to the neutral conductor as provided in Rule 141 are not considered "energized lines."

b. When work is to be done on or near "energized lines," all energized conductors, grounded conductors, or guy wires within reach of any part of the body shall be covered with protective equipment, except that part of the conductor or apparatus on which the employee is to work.

c. When working on de-energized lines or equipment, all energized lines and normally energized equipment within reach of any part of the body shall be covered.

d. In applying protective equipment, an employee shall always protect the nearest and lowest wires first, insuring personal protection at all times. In removing protective equipment, the reverse order shall be maintained. Protective equipment shall be applied from a position underneath the conductor when possible.

e. Work shall not be performed on downed overhead lines until they have been proven de-energized and grounded as provided in rule 141, unless they are being cut in the clear, with live line tools, to protect from personal injury.

208. Four-Wire High-Voltage Circuits

a. The overhead neutral conductor shall be considered the same as a phase conductor.

b. The neutral conductor in the overhead or underground shall not be opened except on authority the Grid Ops Manager or equivalent authority.

209. Working in Elevated Positions

a. Before climbing poles or structures, employees shall familiarize themselves with the circuits, voltages, apparatus thereon, and any unusual conditions which might present a hazard.

b. Not more than one employee shall ascend or descend a pole at the same time. The first employee shall be in place on the pole or on the ground before the next employee climbs or descends the pole. When it becomes necessary for one employee to work above the other, extreme care shall be exercised.

c. Before climbing poles, ladders, scaffolds, or other elevated structures, or riding span wires, messengers, or cables, or entering cable cars, boatswain chairs, or the like, employees shall first assure themselves that said structure or device is strong enough to safely sustain their weight.

d. Before allowing employees to work on any pole from which supporting wires or guys are to be removed, or on which in any way the stress is to be changed, the employee in charge shall make sure that the pole will stand the change in stress without falling. If it is necessary to test the pole, see Rule 202. When the condition of the pole to be worked on is in doubt or when it is not practicable to test, the pole shall be supported before work is started.

e. Employees shall observe height nail or pole brand to make certain that the pole is set to proper depth. (Manufacturers usually place their pole brand 10 feet from the butt end of the pole on 25-foot to 60-foot poles and 13 feet from the butt on all poles 65 feet or longer.)

f. Employees shall not transfer from aerial buckets or baskets to a pole or structure. Transfer from an open platform to poles or structures are permitted.

g. Climbers shall not be worn while performing work from an aerial lift.

h. Neither the bucket nor boom shall be allowed to contact unprotected energized conductors. This does not preclude the use of attachments to the boom specifically designed to support energized conductors.

i. When using power tools, grounded material or equipment such as wire, cable, personal grounds, electric cords, etc., approved for use on erected poles, towers, or structures, the tools and all electric supply lines connected thereto shall be kept a safe distance under the level of circuit or apparatus energized in excess of 600 volts or shall be adequately guarded or secured in such a way as to prevent their contacting energized conductors.

j. Only approved portable power saws shall be used from elevated positions on erected poles.

210. Working Position

When working on energized lines or apparatus, work shall be done from below when possible.

211. Setting or Removing Poles

a. All persons not engaged in pole setting operations shall be kept out of the work area.

b. No one shall be allowed on a gin pole when it is being used to raise another pole.

c. When setting or removing poles between or near exposed energized high voltage conductors:

   1. The pole shall not be allowed to make intentional contact with exposed energized high voltage conductors.

2. A minimum distance of three feet shall be maintained between unprotected conductors energized below 72 kV and portions of the equipment which provide a conductive path to the frame or the body of such equipment. For voltages above 72 kV, maintain clearances specified in Rule 147.
3. Employees handling the butt of the pole shall wear rubber gloves whether or not cant hooks or slings are used.
4. No one shall step on or off the truck or touch any part of the truck from the ground while the pole is being set or until it is secured in such a manner that it could not possibly come in contact with an energized conductor.

212. Safety Straps and Lanyards

a. Employees shall not work on a pole or any elevated structure including truck-mounted streetlight ladders and mechanical or hydraulic lifts without first securing themselves with a safety strap or lanyard unless proper railings or guards are used. If a lanyard is utilized, it shall be of such length as to limit a free fall to as short a distance as practicable not to exceed six feet.

b. Employees shall not belt off to adjacent poles, structures, or equipment while working from an aerial lift.

c. Employees shall be belted at all times when on wood poles.

EXCEPTIONS:

1. Free climbing shall be allowed to first pole step. Maximum 15 ft head height.
2. Free climbing shall be allowed when utilizing pole steps.
3. Free climbing shall be allowed when obstructions prohibit using a safety.

213. Hot Washing Insulators

a. When hot washing insulators:

1. A minimum nozzle pressure of not less than 400 pounds per square inch shall be used.
2. Water resistivity of less than 500 ohms per inch cube shall not be used for energized lines.
3. Water resistivity of not less than 20,000 ohms. inch (50,800 ohm.cm) or the conductivity of not more than 20 micro-mhos. centimeter shall be used for substations.
4. Water resistivity shall be tested by an approved water testing device at each filling of the water container, and when the water has been stored or sitting in the water container for four hours or longer.

b. The following table constitutes the minimum safe working distances from energized conductors when hot washing insulators:

Line Voltage	Nozzle Sizes 15/64"	Nozzle Sizes 7/32"
4 kV	7 ft.	4 ft.
12 kV	7 ft.	5 ft.
16 kV	7 ft.	5 ft.
33 kV	8 ft.	6 ft.
66 kV	9 ft.	7 ft.
115 kV	10 ft.	9 ft.
220 kV	12 ft.	12 ft.
500 kV	14 ft.	14 ft.

c. Grounding and bonding requirements when using conductive hoses.

1. When washing with a hand gun or utilizing fixed sprinklers, the wash pumper truck shall be bonded to the same metal structure supporting the insulators being washed.
2. All equipment used in the washing procedure shall be bonded to the metal structure supporting the insulators being washed.
3. During washing operations, employees shall not be permitted to step on and off the truck or metal structure, or touch any part of the truck, conductive hoses or metal structure while standing on the ground.

d. Grounding and bonding requirements when using non-conducting hoses.

1. When a non-conductive hose is used and the operator is in contact with the metal structure, the gun, if conductive, shall be bonded to such metal structure.

214. Wire Stringing

a. When stringing or taking down wires, the number of persons actually handling the wire at any one time shall be held to a minimum. Running lines, hold down lines, and tag lines shall be used and left attached until the wires are in place and properly secured. It is the duty of the employee in charge to see that such means of protection are adopted as are necessary to make the work safe.

b. When stringing or taking down wire along or over streets or highways, the equipment pulling the wires shall be provided with flags, front and rear. Other precautionary measures, such as flagmen, cradles, and barriers shall be used as required.

c. When stringing or taking down wires from above or below unattached energized lines or on poles or towers on which there are attached energized lines of over 600 volts, precautions shall be taken to adequately insulate the employees from the wire or wire stringing equipment by the use of rubber protective equipment or other approved methods. Employees shall not contact wire stringing equipment in a manner which would permit their bodies to become a parallel path to ground. When conductors being pulled in or out are to be handled by employees on poles or towers, Rule 141 shall apply.

In addition to the above requirements, bare wires (except bare neutrals in multi-conductor cables) shall be pulled over grounded rollers at the first pole or second pole from the payout and takeup equipment and through traveling grounds between the first pole and the payout and takeup equipment. The metal frame of the wire stringing equipment shall be bonded to the traveling ground.

NOTE: Service drops are excluded from the above requirements.

When stringing parallel to lines energized in excess of 35 kV, the conductor being installed or removed shall be pulled over grounded rollers at the first structure adjacent to both the tensioning and pulling set-up.

d. When stringing or taking down wires crossing over lines energized at 300 volts or more, suitable protection or guards shall be installed at the point of crossing as necessary.

215. Capacitors

a. Before work is done on capacitors of any voltage, the capacitors shall be de-energized using the device approved for this purpose. Contact shall not be made with any pole top apparatus as specified in Rule 205 or metal hardware in the area of an energized capacitor bank. Before any work is performed on capacitors of any voltage, the capacitors shall be de-energized using the device approved for this purpose. In addition, one of the following shall apply on voltages above 600 volts:

   1. The jumpers to the fuse holders shall be removed from the line. After waiting five minutes, the capacitor terminal(s) shall be shorted by means of temporary jumpers and adequately bonded to the case; or,
   2. After waiting five minutes, the leads between the open fuse holders and the capacitors shall be grounded and the capacitor terminal(s) shall be shorted by means of temporary jumpers and adequately bonded to the case.

      Rubber gloves or live line tools shall be used while placing the short circuit on voltages up to 7,500 volts. On voltages above 7,500 volts, live line tools shall be used.

b. Before climbing into or through the area of a capacitor installation, automatically switched capacitors shall be de-energized and the controls made inoperative. On non-automatically switched capacitor installations, contact shall not be made with pole top apparatus as specified in Rule 205 or other metal hardware in the area of an energized capacitor installation.

216. Transformer

No work shall be performed on the high voltage side of a de-energized transformer, normally energized above 600 volts, until either:

   1. The fuses have been pulled and the taps to the fuse holders removed from the line; or,
   2. The leads between the open switches or fuse holders and the transformer have been grounded

217. Banked Secondaries

a. Where secondaries of transformers are banked or there is a possibility of a backfeed, the transformer secondary leads shall be disconnected in addition to pulling primary fuses before any work is done on a transformer.

b. Primary lines sectionalizing devices shall not be located between transformers with banked secondaries.

218. Reserved

219. Metal Ratchet Hoists

Metal ratchet hoists or power pulls shall not be attached to energized conductors. Such hoists shall not be used where conducting parts can come closer than 18 inches to unprotected conductors energized below 600 volts. For voltages above 600 volts, refer to rule 147.

220. Use of Metallic Hoisting Lines

Metallic hoisting lines shall not be taken above the level of conductors energized in excess of 600 volts, except when using pole setting equipment with a boom which extends above that level and the conductors are covered with approved devices or spread to prevent accidental contact.

221. Live Line Tools — General

a. All lines energized at 7500 volts phase to phase or above shall be handled only with live line tools. Exception: Employees certified to use rubber gloves up to 17kv on overhead distribution circuits.

b. All live line tools shall be approved by the Corporate Safety Department before being put into use. No alterations shall be made without approval.

c. Except as outlined in General Rule 155, when work is to be performed on energized lines by means of live line tools, two qualified electrical workers shall be assigned to do the work.

222. Use of Live Line Tools

a. When using live line tools, employees shall not place their hands closer than is absolutely necessary to the energized line or the energized metal parts of the tool being used and in no case closer than specified in Rule 147. All live line tools used on voltages from 72 kV to 242 kV shall be marked at a point 63 inches from the tool end of the stick.

b. Metal parts of live line tools or energized conductors shall not be brought into contact with crossarms, poles, associated hardware, or apparatus.

c. Other work shall not be done on a pole or structure upon which live line work is in progress.

d. Employees working with live line tools shall use adequate protective equipment on primary conductors,

low-voltage conductors, telephone circuits, and other wires which are within reaching distance.

e. Hold out ropes or live line tools being used to spread or raise conductors shall be securely fastened and shall not be held by employees except as necessary to secure or release them.

f. Live line tools shall not be hung on a conductor. An approved tool hanger or bag shall be used.

g. Breakers or approved link sticks shall be used with ropes when they are considered necessary by the supervisor in charge.

223. Reserved

224. Loading and Transporting Poles on Trucks, Trailers, and Dollies

a. Trailer and dolly wheels shall be securely braked or blocked before loading.

b. While loading a pole, employees shall not stand between the pole pile and the loading or transporting equipment. When a pole is being rolled from the pile or from the ground to trailer or dolly, it shall be done with a line and cant hooks.

c. When poles are loaded on a flat bed, battens, bolsters, or sleepers shall be used beneath the bottom layer, unless special approval has been granted.

d. Bolster-type loads shall be loaded in a pyramidal fashion, each succeeding layer containing one less pole until pay load or a peak of one pole is reached. Each layer shall be securely nested on the one below.

e. When using bolsters with chocks, each layer above the bottom layer shall be secured with straps, tie wire, or other approved means except the top pole, which shall be held in place by the overall tie chain.

f. When hauling poles, a second bolster shall not be used on top of the first layer of poles except for cedar poles 50 feet or less in length.

225. Tree Trimming Safety Lines

a. The safety line shall not be used as a pull rope or as a rope to lower limbs or branches.

b. Employees shall not perform the actual tree cutting or trimming from an elevated position until they have secured themselves by safety belt or safety line.

226. Lowering Branches

When power equipment is required to lower heavy branches, the entire operation shall be in sight of the employee in charge.

227. Rope Safety

When using a chain saw or axe in a tree, a 3/4-inch rope safety which has a 3/16-inch flexible steel cable in the center shall be used, unless a safety line is being used in conjunction with the rope safety.

228. Crotching

a. Safety line shall be crotched around the main trunk to prevent its "working out" on the lateral limb.

b. When working in a multiple trunk tree, the safety line shall be crotched around a main trunk other than the one on which the employee is working.

229. Working Near Energized Conductors

a. When working over wires, the employees shall have their safety line so secured that, in the event of a slip or a breaking limb, they will swing free and clear of the wires.

b. When trimming trees or hedges located under energized lines, employees shall stay below the wires and maintain a safe distance from them.

c. Employees shall not remove tree limbs or branches from above energized conductors while other work is being performed in trees below the conductors in the same span.

230. Climbers

a. Climbers shall be worn only when engaged in work requiring their use.

b. Climbers shall not be used after the gaffs are worn or filed to less than 1¼ inches long, measured on the underside of the gaff.

231. Deleted

232. Tree Trimming

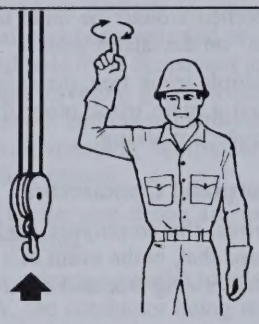
a. Before climbing a tree, the employee shall observe its general condition.

   1. If the trunk of the tree shows cavities, disease, or gives indications of the presence of wood-destroying insects, it shall be assumed that its limbs are also in an unhealthy condition.

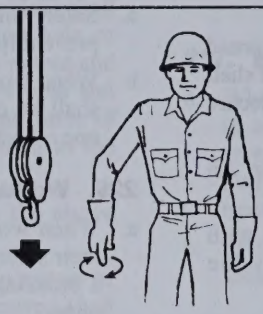
   2. If it appears the tree will not bear the weight of an employee, he/she shall not attempt to climb it until adequate precautionary measures are taken, such as guying, roping, or crouching in adjacent tree.

b. Rope safeties, safety lines, saddles, and hooks shall be periodically checked.

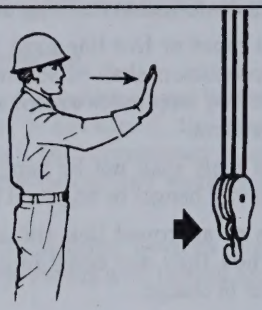
Overhead and Gantry Crane Signals



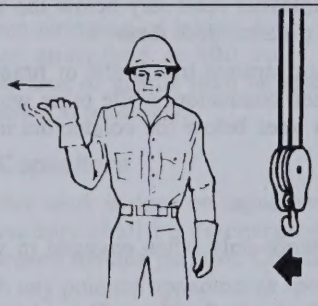
HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circle.



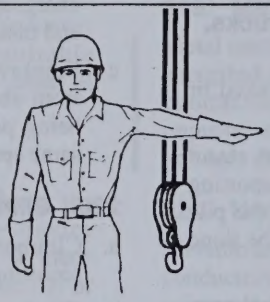
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circle.



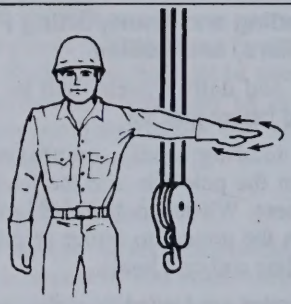
BRIDGE TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



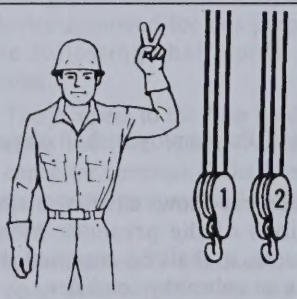
TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.



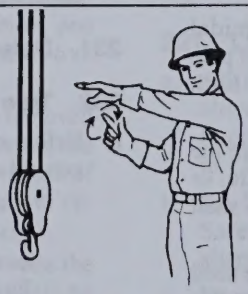
STOP. Arm extended, palm down, hold position rigidly.



EMERGENCY STOP. Arm extended, palm down, move hand rapidly right and left.

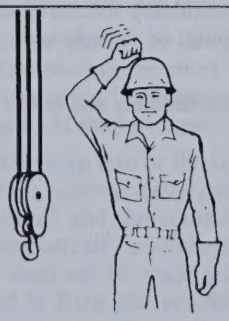


MULTIPLE TROLLEYS. Hold up one finger for block marked "1" and two fingers for block marked "2." Regular signals follow.

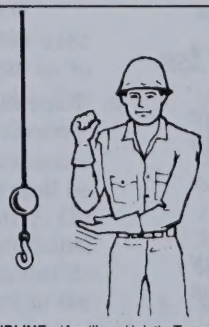


MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)

DOG EVERYTHING. Clasp hands in front of body.



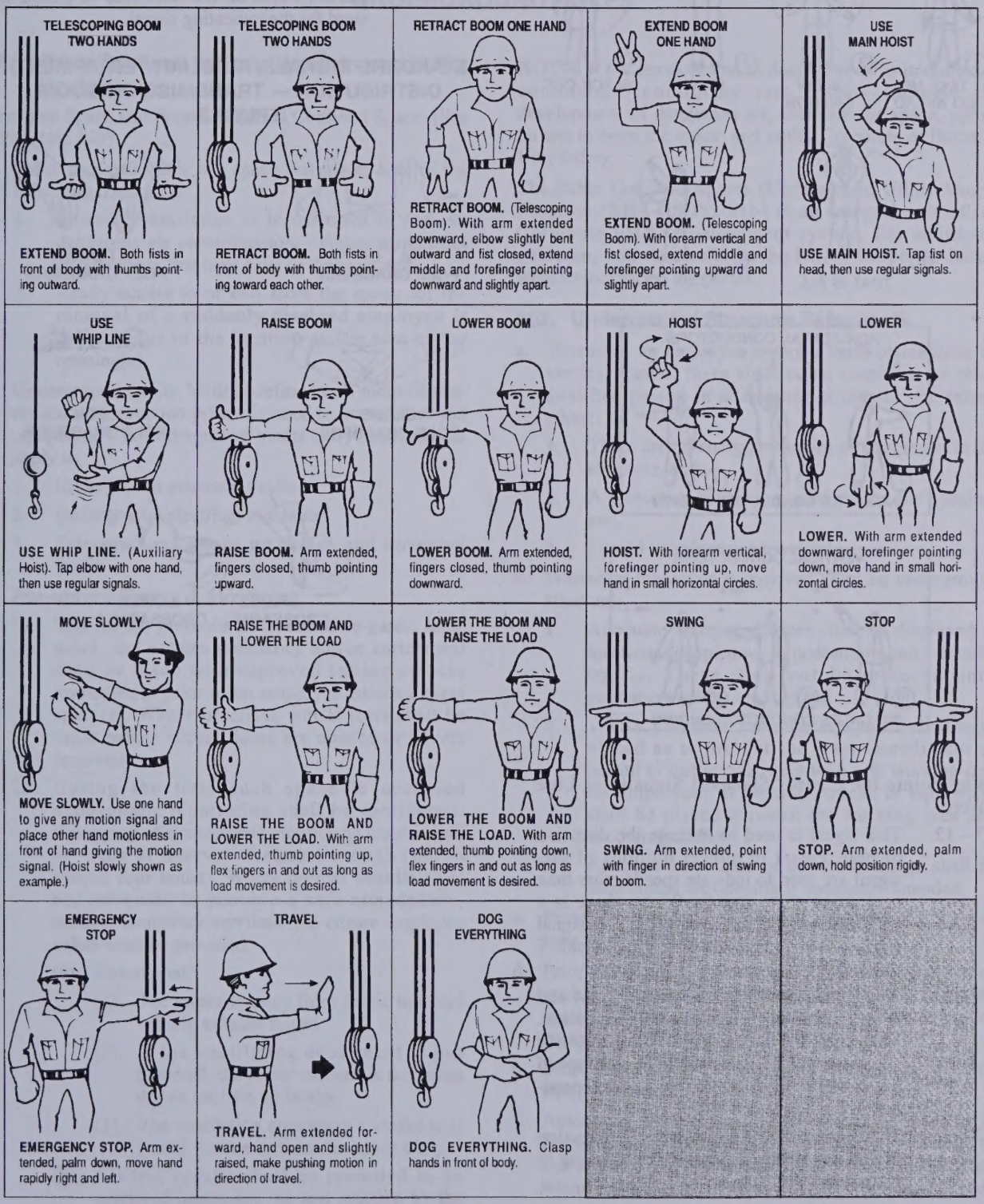
USE MAIN HOIST. Tap first on head; then use regular signals.



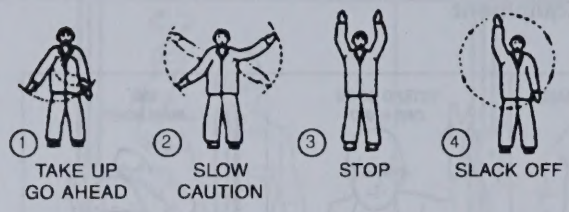
USE WHIPLINE. (Auxiliary Hoist). Tap elbow with one hand; then use regular signals.

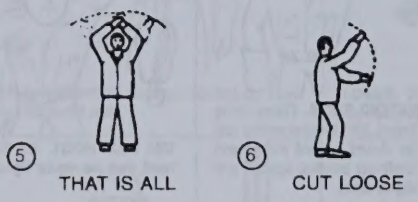
MAGNET IS DISCONNECTED. Crane operator spreads both hands apart — palms up.

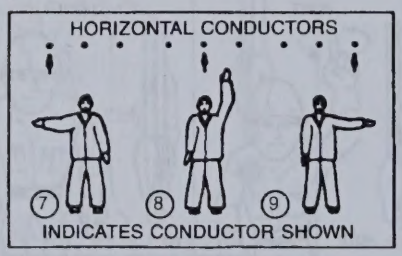
Standard Signals for Derricks, Cranes, and Distribution and Transmission Trucks Using Boom-Type Equipment

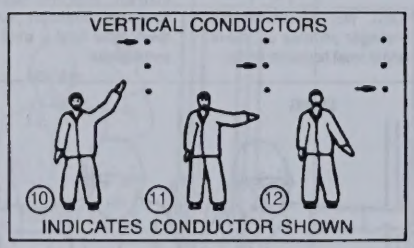

TELESCOPING BOOM TWO HANDS
EXTEND BOOM. Both fists in front of body with thumbs pointing outward.
TELESCOPING BOOM TWO HANDS
RETRACT BOOM. Both fists in front of body with thumbs pointing toward each other.
RETRACT BOOM ONE HAND
RETRACT BOOM. (Telescoping Boom). With arm extended downward, elbow slightly bent outward and fist closed, extend middle and forefinger pointing downward and slightly apart.
EXTEND BOOM ONE HAND
EXTEND BOOM. (Telescoping Boom). With forearm vertical and fist closed, extend middle and forefinger pointing upward and slightly apart.
USE MAIN HOIST
USE MAIN HOIST. Tap fist on head, then use regular signals.
USE WHIP LINE
USE WHIP LINE. (Auxiliary Hoist). Tap elbow with one hand, then use regular signals.
RAISE BOOM
RAISE BOOM. Arm extended, fingers closed, thumb pointing upward.
LOWER BOOM
LOWER BOOM. Arm extended, fingers closed, thumb pointing downward.
HOIST
HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circles.
LOWER
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circles.
MOVE SLOWLY
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)
RAISE THE BOOM AND LOWER THE LOAD
RAISE THE BOOM AND LOWER THE LOAD. With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.
LOWER THE BOOM AND RAISE THE LOAD
LOWER THE BOOM AND RAISE THE LOAD. With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.
SWING
SWING. Arm extended, point with finger in direction of swing of boom.
STOP
STOP. Arm extended, palm down, hold position rigidly.
EMERGENCY STOP
EMERGENCY STOP. Arm extended, palm down, move hand rapidly right and left.
TRAVEL
TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.
DOG EVERYTHING
DOG EVERYTHING. Clasp hands in front of body.

STANDARD SIGNALS FOR LINE WORK









Key Points for Figure "Standard Signals for Line Work"

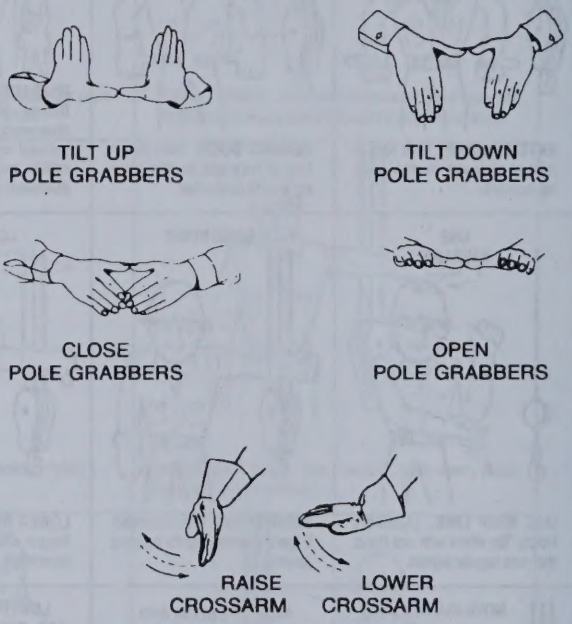
7 – 12. This signal is used to indicate the direction of pull. Faster or slower motions of this signal are used to indicate speeds other than caution or slow speeds. Where there is a choice of conductors to be pulled, this signal is given with one of the indicating signals 7 to 12 inclusive.

7 – 12. This signal always follows either 1 or 4 and is an indication of slow speed for caution. This signal must be given continuously while the pull is being made at slow speed and is to be either giving the 1, 4, (depending on direction) or 3 signal.

7 – 12. This signal is used to indicate the direction of pull and is used in slacking or lowering as is used for taking up.

7 – 12. These signals are always used in connection with either or and are given at the same time as either or is given. In using, and, the person's arm on the wire side to pulled is used for the indicating signal.

STANDARD SIGNALS, AUXILIARY EQUIPMENT, DISTRIBUTION – TRANSMISSION BOOM TRUCKS



Section 300
UNDERGROUND RULES

301. Other Confined Spaces (Underground Utility Vaults)

Confined Space and Permit Required Confined Space. (See APM Rule 143)

a. Other confined space is a space that meets *both* of the following conditions:
   1. Existing ventilation is insufficient to remove dangerous air contamination, oxygen enrichment or deficiency that may exist or develop, and,
   2. Ready access to or exit from the space for the removal of a suddenly disabled employee is difficult due to the location and/or size of the opening(s).

b. Underground Utility Vault is defined as a room of fire-resistant construction primarily used to house electrical equipment. The underground vaults entry requirements apply to:
   1. Underground electrical vaults
   2. Underground electrical manholes
   3. Telecommunications manholes and unvented vaults

c. Atmospheric Testing & Monitoring
   1. Test for the presence of combustible gases, toxic gases, and oxygen deficiency and/or enrichment shall be made with approved testing devices immediately prior to an employee entering these space(s). Where practical, initial tests shall be made before access doors are opened or covers removed.
   2. During the time such space is occupied atmospheric monitoring shall be continuous. Relogging of atmospheric monitoring results shall be made at intervals frequent enough (not to exceed four hours). Where normal ventilation is not adequate to provide a safe atmosphere, suitable temporary ventilation to ensure employee safety shall be provided.
      (a). Ensure that:
         (1). The intake is away from traffic to avoid vehicle exhaust fumes.
         (2). If the ventilating equipment is gas powered, the motor exhaust is not being drawn into the air intake.
         (3). The ventilation equipment's intake is at least 5 feet away from the space entry.
      (b). All test results shall be recorded in an approved inspection log and retained by the work location for one (1) year.

NOTE: If the development of dangerous air is imminent or continuous monitoring test results indicate the development of dangerous air, evacuate the space, permit no one to enter the space, and notify Corporate or Business Unit Safety.

The Other Confined Spaces (Underground Utility Vaults) Program (EHS-CS-PG-016) is an integral part of the Corporate EH&S management system. For additional guidance, you must refer to the EH&S Corporate Safety website located on the portal.

302. Underground Structure Safeguards

a. Whenever an employee enters a vault or manhole by vertical means, there shall be an employee or other qualified person in attendance at the surface except when:
   1. There are no energized cables or equipment in the structure, and;
   2. A protective device is placed around the opening; and,
   3. Forced ventilation is provided.

b. Whenever the cover is removed from an underground structure:
   1. Adequate warning devices shall be displayed in locations conspicuous to pedestrians and vehicular traffic. These shall not be removed until permanent covers are in place.
   2. Trucks, tool carts, and other equipment shall be so placed as to present the least impediment or hazard to traffic consistent with safe working area for employees. If possible, trucks or equipment shall be placed between the working area and oncoming traffic.
   3. Adequate barricades or standard railings shall be used unless the opening is constantly attended.

c. Protective barriers are sufficient safeguards for walk-in type vaults and shall be used.

d. Prior to and after entering an underground structure or enclosure, and before performing any work, employees shall perform a thermal inspection of all cable and/or equipment energized in excess of 600 volts.

e. Employees shall not stand on energized cable or equipment while working in BURD enclosures.

f. Automated Underground switches shall be made local and non-automatic/solid before working in proximity to the switch. The switching center shall be notified whenever the status of an automated switch is changed.

303. Energizing Equipment

a. No new piece of cable or switching device shall be energized until it has been positively identified by tags or other approved marking procedures.

b. No piece of equipment shall be energized until all terminals, cables, and positions have been safe ended, endbelled, or otherwise protected in a way that would prevent a short circuit, ground, or personal contact.

c. Employees shall not enter a structure or enclosure where new, rebuilt, or modified high-voltage cable or equipment has been energized for the first time until the cable or equipment has been energized for a minimum of five minutes.

304. Fused Underground Equipment

The fuses in underground equipment shall not be installed or removed until de-energized (this does not apply to fuses designed to interrupt load) and then only with live line tools or after grounding by approved methods.

305. Working on Energized Cables

a. Cables energized at more than 600 volts shall not be cut or spliced while energized until permission has been granted by the Supervisor in charge.

b. Rubber gloves shall be worn while performing the following work on conductors energized below 7500 volts.

1. Cutting or removing metallic sheathing, semi-conductor, or shielding;
2. Removing or applying insulation;
3. Working on bare conductor.

c. Before removing a section of metallic sheathing or semi-conductor from cables energized above 600 volts, both sides shall be bonded together with a metallic jumper.

d. When working on energized underground conductors or parts of energized equipment, adequate barriers or suitable protective covering shall be provided to prevent accidental contact with other conducting surfaces, including grounds.

e. Live line tools shall be used when installing or removing taps between the concentric neutral conductor and any grounding point if the neutral is in service. For the purpose of this rule, the neutral will be considered in service at all times after its initial installation.

f. All work on energized loadbreak components shall be performed by the policies addressed in Rule 312 b.

306. Working on De-Energized Cables

a. Cable or equipment to be worked upon shall be positively identified by tags, duct location, maps or approved testing means before work is started. Work will then be performed as indicated in Rules 306 b., c., d., and/or e., as appropriate.

b. Cable and equipment shall be considered energized and worked with adequate protective devices until it has been tested de-energized with an approved device for indication of voltage and grounded with approved ground devices.

c. Clearances, if required, shall be obtained in accordance with established procedures. After de-energized and before proceeding with the work on all power supply cables normally energized in excess of 600 volts, all conductors shall be short-circuited and grounded according to Business Unit procedures.

1. Between the place where the work is being done and each possible source of supply, or
2. at the work location, or
3. as close as practicable to the source of supply.

d. Cables normally energized at more than 600 volts shall be spiked, or grounded at the work location. When cable is to be spiked, it shall be done so all employees are remote from the spiking operation, i.e., from outside, an enclosure, walk-in vault, underground structure or excavation. The foregoing procedure shall be followed to prove any normally energized cable de-energized before opening the sheath.

e. All switches through which it is possible to energize the power supply cable to be worked upon shall be opened and tagged.

307. Moving Underground Cable

a. All in-service cables that are to be moved shall be carefully inspected before and after moving.

b. Cables energized in excess of 600 volts shall be moved only under the direction of the supervisor in charge.

c. Cables energized in excess of 600 volts shall be moved only under the direction of the employee in charge.

308. Installing and Removing Underground Cable

a. When installing or removing underground cable in proximity to exposed conductors energized above 300 volts, adequate precautions shall be taken to prevent accidental contact between the cable or metallic pulling devices and exposed energized conductors. In addition, employees handling cable, reels, and tending reel dolly shall be adequately protected.

b. Ducts shall always be fished in the direction which presents the least hazard. An employee shall be stationed at each end except when the employee in charge determines that no hazard exists.

c. When pulling underground cable at riser poles in proximity to exposed energized conductors in excess of 300 volts, an approved cable pulling device, based on cable size and type, shall be used. An approved pulling nose shall be used when pulling PILC cables.

d. Pull ropes, fish tapes, and cables shall not be pulled into a duct already occupied by energized conductors.

309. Operating Underground Switches

a. The opening or closing of energized switches or cutouts in an underground vault, manhole, CST enclosure, or similar structure, shall be performed remotely. If remote operation is not possible, the source shall be de-energized by means of an adjacent switch, C.B., etc. where remote switching can be accomplished.

EXCEPTION: A switch may be considered de-energized, for the purpose of switching only, when all of the following conditions exist:

1. The switch contains only one circuit and is in a dead section of line as verified through the Switching Center.
2. Rules 309 b., c., d., e., f., and g. have been complied with.

NOTE: See the Electric Distribution Remote Operation of Underground Switches Manual and Maintenance Policy and Procedures Manual for additional operating instructions and approved equipment.

b. Each step of routine or emergency switching shall be verified by two qualified employees at the work location.

EXCEPTION: One qualified electrical worker in a classification that normally works alone, and who is trained in "self-tailboard", may verify each step of switching and operate energized "above ground" switches such as padmount or PMH type switches, or other switches located on pads.

c. For automatic circuit recloser operations. (See Rule 316)

d. Locate, identify, and mark the position to be switched.

e. Check all the existing positions of the switch and compare to the circuit map, switch schematic, and cable tags to ensure that the switching order will accomplish the desired results.

f. If switching on a "RAC" type switch, a blocking device or special handle must be used to ensure that the switch is operated only to the desired position.

g. When switching energized underground single-phase fuses or disconnects in live front PMH type equipment, an approved protective shield shall be affixed to the grip-all stick. This also includes switching in single-phase padmounted fuse cabinets. This does not apply to equipment where the fuses or disconnects are required to be de-energized. (APM Rule 304)

310. Disconnect Switches

Switches, or junction boxes with exposed air break blades, shall not be operated to drop load. This rule does not apply to switches designed to interrupt load.

311. Permissible Work in Livefront Padmounted Transformers

a. High-Voltage Compartment — Both Lines Energized

1. Operation of switch handles with live line tools.
2. Phasing between lines. Probes of phasing set to be insulated to within three inches radially of probe end.
3. Removal of protective barriers with high-voltage rubber gloves or live line tools.
4. Testing of phasing voltmeter or electrostatic voltage indicator.

b. High-Voltage Compartment — One Line De-Energized

When work is to be performed in the high-voltage compartments with one line de-energized, the following procedure shall be followed in de-energizing and working on the de-energized line.

1. Necessary switching shall be performed to de-energize the lines (with live line tools).
2. Test de-energized line with an approved testing device.

   After this procedure has been followed for all sources of supply, a clearance may be obtained. Testing and grounding will normally be required at two locations.
3. Application of approved ground cluster with live line tool.
   (a). First ground cluster terminal to be applied to accessible ground wire in high-voltage compartment.
   (b). Remaining ground cluster terminals should be placed between bushing terminals and pothead connections.
4. After testing and application of grounds, work may be performed by hand on the de-energized conductors, provided:

a. Ground cluster terminals are between the worker and any possible source of supply.

b. Adequate protective barriers on energized side of compartment are positioned so as to prevent accidental contact by workers or material.

312. Plug-In Terminations

a. Deadbreak Terminations

Normally energized high-voltage plug-in terminations shall be removed and installed only with live line tools after being tested de-energized with an approved testing device immediately prior to the operation. Live line tools are not required when applicable sections of Rule 306 are complied with.

b. Loadbreak Components

1. When operating energized loadbreak components, the automatic circuit recloser on the circuit(s) being worked shall be made nonautomatic. (See Rule 316 a. (4))
2. Normally energized high-voltage loadbreak components shall be operated only with live line tools by two qualified electrical workers.
3. In loadbreak operations, the loadbreak elbow shall be installed on an appropriate accessory

component immediately after removal. The components from which the elbow was removed shall also be safe ended.

4. When it is necessary to ground a loadbreak elbow which has been removed from a source component, the elbow shall be tested de-energized with an approved testing device immediately prior to being installed on a ground component.
5. Energized loadbreak components shall not be operated from inside a walk-in vault, underground vault, or manhole.

c. Thermal Inspections

A thermal inspection shall be conducted prior to the removal of any capacitive test point cover. If the thermal reading exceeds the allowable temperature levels referenced in the O&M Manual, the component to be worked on shall be de-energized prior to removal of the capacitive test point cover.

d. Removal/Installation of Capacitive Test Point Covers

Capacitive test point covers shall be removed and installed only with live line tools or high-voltage rubber gloves.

e. Testing Capacitive Test Points

When testing capacitive test points with an electrostatic test device, the device shall be attached to a live line tool or be held by an employee wearing high-voltage rubber gloves.

313. Use of Wire Rope

a. Wire rope shall not be used to pull cable in a duct already occupied by conductors.

b. Wire rope may be used to raise or lower equipment in a manhole or vault only when:

1. The wire rope is rigged at least six feet from all exposed energized conductors or equipment, or
2. The energized conductors or equipment are adequately covered or protected.

314. Heating Materials

a. The heating of metals, oils, and insulating compounds shall be done in such a manner as to minimize hazard to the employees working in walk-in vaults or underground structures and to vehicular or pedestrian traffic.

b. Furnaces and tanks containing liquefied petroleum gas shall not be placed in walk-in vaults or underground structures.

c. Gloves shall be worn by employees while heating or handling hot insulating compound and metals.

315. Raising and Lowering Materials Into Manhole or Vault

a. Employees shall use equipment provided for lowering material and small tools into manholes and vaults. Approved pot hooks shall be used when lowering solder pots and compound kettle. Solder ladles shall be lowered separately.

b. Before lowering hot metals, oils, or hot compounds into a manhole or vault, those working in the hole shall be warned to stand clear. The employee on the surface shall not lower material until so instructed from below.

316. Automatic Circuit Recloser Operation

a. The automatic circuit recloser on the circuit being worked shall be made non-automatic when:

1. Splicing or patching energized high-voltage underground cable.
2. Relocating energized high-voltage underground cable or equipment.
3. Filtering or replacing oil on energized high-voltage underground equipment.
4. Operating energized loadbreak components.

NOTE: In addition to the above requirements supervisors in charge may make automatic circuit reclosers non-automatic whenever they deem it necessary for the safety of the employees performing the work.

b. When employees are working inside an underground structure to make repairs immediately following a high-voltage failure, the automatic recloser of all energized circuits contained in that structure shall be made nonautomatic. For those circuits not equipped with an automatic recloser device, a no test or hot line order shall be issued.

317. Capacitors

a. Submersible Capacitors

The following procedures shall be completed prior to performing work on capacitors of any voltage.

1. The capacitors shall be de-energized using the capacitor switch provided.
2. Visually check the capacitor switch open.
3. The source switch position to the capacitor switch shall be opened, locked, and tagged. Using live line tools, the line side terminations of the capacitor switch shall be tested de-energized and grounded.
4. After waiting a minimum of five minutes from de-energizing, the capacitors shall be tested and grounded using live line tools.

b. Padmount Capacitors

The following procedures shall be completed prior to performing work on capacitors of any voltage:

1. The capacitors shall be de-energized using the capacitor switches provided.
2. Visually check the capacitor switches open. If any are closed, open manually with live line tools.
3. Check for elimination of current flow with clamp-on ammeter.

4. The source switch position to the capacitor switches shall be opened, locked, and tagged. Using live line tools, the primary terminals to the capacitor installation shall be tested de-energized and grounded.
5. After waiting a minimum of five minutes from de-energizing, the capacitor terminals shall be shorted by means of temporary jumpers and adequately bonded to the case and grounded, using live line tools.

Section 400
SUBSTATION RULES

401. This Section Shall Apply to Substation Operation and Maintenance.

Rules pertaining to switching and clearances are covered in the Switching and Clearance Section.

402. Reserved

403. Entering or Working in Stations

a. **Attended Substations:** Any personnel (employees, contractors, or visitors) entering an attended substation, except personnel permanently based there, shall report their presence and the purpose to the System Operator in charge, immediately. This information, along with the date and time, shall be recorded in the station's daily general log by the System Operator in charge or in the Visitor Log by a designated member of the visiting party. All members of the visiting party must be logged in by a responsible member of the visiting party, or the responsible member must sign in the number in the party and maintain an accurate list of all personnel in their party and be prepared to present this list on demand. The Visitor Log shall be formatted to record names, the date, and time of arrival and departure, and the purpose of the visit.

   Personnel shall provide the System Operator with suitable contact information, such as a radio or cell phone, to be used in case of an operating or other emergency. The responsible person shall inform the System Operator when leaving the station.

b. **Unattended Substations:** Any personnel (employees, contractors, or visitors) entering an unattended station control house, shall report their presence and the purpose within (2) minutes to the Switching Center System Operator having jurisdiction and the Acting Operator on site, if applicable. The visiting personnel shall make an entry in the substation log which includes the responsible person's name, the date and time of arrival, and the purpose of the visit. The visiting personnel shall make a second entry stating the time of departure. This responsible person must maintain an accurate list of all personnel in their party and be prepared to present this list on demand.

   Personnel not allowed access to unattended station control houses, prior to entering the substation, shall inform the Switching Center System Operator having jurisdiction of their intent and purpose for entering the substation. Once inside, they must report their presence to the Acting Operator on site, if applicable. The System Operator shall make an entry in the Switching Center daily general log which includes the responsible person's name, date and time of arrival, and purpose of the visit. This responsible person must maintain an accurate list of all personnel in their party and be prepared to present this list on demand. The System Operator will record the time of departure in the Switching Center daily general log.

   Personnel shall provide the System Operator with suitable contact information, such as radio or cell phone, to be used in case of an operating or other emergency. The responsible person shall inform the Acting Operator on site, if applicable, and the System Operator when leaving the station.

c. **Hydro Divisions will follow existing Hydro Entry Procedures:** Any personnel (employees, contractors, visitors, emergency personnel) prior to entering any unattended station will call Control Station for stations in Eastern Division or Big Creek 3 for stations in Northern Division.

404. Working Upon De-Energized Conductors and Equipment

a. Clearances are required on conductors or equipment normally operated at a voltage in excess of 600 volts. They shall be obtained by a qualified person who shall be responsible for determining that the conductors or equipment are disconnected from all sources of supply.

b. After authorized persons have been notified that such conductors or equipment are cleared for work, and/or the proper clearance obtained, tests shall be made to determine that conductors or equipment are de-energized and grounded in accordance with Rule 141, the Grounding Manual, and/or Business Unit procedures before work is started.

c. Where the working hazard would be increased by the application of grounds, they need not be applied if the supervisor approves this action and all other alternatives have been considered.

405. Clearance on Station Equipment

a. Before beginning work on any equipment or structure at any station, the employee in charge of the work shall ensure that all crew members know the status of the equipment, what part, if any, is energized, location of grounds, limits of the work space, and what open secondaries, circuit breakers, disconnects, or switches isolate the equipment from all sources of supply. If for any reason there is an interruption in the work where personnel leave the job (such as stopping for lunch), before work is resumed the same formality with conditions shall be followed as at the beginning of the job.

b. If the status of equipment on which a clearance is held is to be changed by switching, the clearances shall first be released and then after switching is completed, new clearances shall be issued in accordance with rules in the Switching and Clearance Section.

c. When it is necessary to do any switching in an energized structure where personnel are working, the station operator, system operator, or acting operator shall make every attempt to contact the employee in charge of the work in the structure, via Company radio, phone line, pager, or horn, to notify personnel prior to operation of equipment. Personnel working in the station shall utilize the Company radio, phone, or pager to maintain contact with the system operator. When it is necessary to perform disconnect switching in an energized structure where personnel are working, the station operator, system operator, or acting operator shall notify the employee in charge of the structure, who in turn shall call personnel away from the structure, until the switching has been completed. After disconnect switching is complete, all personnel shall recheck the status of the structure, lines, and equipment before resuming work. Keep Dispatch Board, OMS, and or Harris updated correctly.

406. Reserved

407. Reserved

408. Qualified Checker Required

No person shall perform work or take any conducting object within the area where there exists a hazard of contact with energized conductors by reason of the work being done, unless under the observation of a qualified checker. Each person shall personally discuss with the checker, and agree upon warning and approval signals and checking communications to be adopted for the individual job. Each person shall receive an approval from the checker before changing location and again after changing location before contacting any apparatus that could be energized. Always stop at working position and receive approval from checker before contacting any equipment.

a. If the supervisor (or authorized representative) in charge shall determine a job to be hazardous because of proximity to energized equipment and shall decide that a checker is necessary to reduce such hazard and prevent accidents, he/she shall designate a qualified checker.

b. Checkers shall be thoroughly instructed and familiarized with all specific hazards before they are allowed to assume the duty of checking.

c. Checkers shall give the personnel under their observation undivided attention and allow no distraction to remove their attention from them.

d. Checkers shall give warning when personnel are approaching energized parts or other hazards and shall repeat this warning when they are near energized parts as often as is necessary to keep the personnel constantly aware of the hazard.

e. Where the nature and extent of the work at any one location is such that one checker cannot adequately watch the movements of all personnel in hazardous areas, additional checkers as necessary shall be used.

f. Workers shall first notify the checker and receive approval before changing from one location to another, and shall designate route to be taken to new location.

409. Working on Energized Disconnect Switches

Work shall not be done on any open disconnect devices of 2.4 kV or over while one side is energized except with the specific permission of the supervisor in charge.

410. Capacitors

Employees shall not work on capacitors until they have been de-energized for a period of five minutes and then grounded.

411. Meggering De-Energized Insulators and Bushings at Energized Stations

When meggering insulators in or around energized stations, there shall be three employees present: first, an experienced and qualified employee to check; second, a properly qualified employee to use the megger stick; third, an employee to operate the megger.

a. When a megger is used for testing, the megger leads shall have not less than one turn around an effective ground, at a point not less than ten feet from the megger.

b. Megger sticks shall not exceed five feet in length. Approval of the use of any stick longer than five feet shall be obtained from the division superintendent for each particular job they are used on and for each separate time they are used.

c. Neither the clip or blade insulators on disconnect switches shall be meggered if the other side is energized.

d. When meggering adjacent to an energized line, meggering shall always start at the insulators nearest the energized line, and shall progress away from it.

e. Megger sticks shall not be lowered to the ground from any height by means of the megger cord.

f. If wiping and meggering is being done simultaneously, each group shall have its own checker.

g. When wiping or meggering multiple unit insulators, the insulator unit nearest to ground potential, that is, the unit which is bolted to the structure, shall be the first unit to be worked upon.

412. Warning Blocks

a. The placing and removing of warning blocks will be the responsibility of the operator who will hang the blocks to conform with the clearances to be issued on the equipment being cleared for work. Persons desiring clearance on station equipment will check warning blocks properly in place before taking the clearance. The warning blocks are not to be removed until the conditions for which they were placed no longer exist and then only by or under the direction of the operator.

b. A yellow warning block is to be placed on each open hook-stick operated disconnect blade when the clip is hot or is considered to be hot and a striped warning block is to be placed on each open hook-stick operated disconnect if the blade is hot or is considered to be hot.

c. Where gang operated open disconnects are involved, a yellow block is to be placed on the operating handle when the blades or clips are hot or considered to be hot, and placed in such a manner that it must be removed before the disconnects can be operated.

d. Indoor Equipment. The use of warning blocks on indoor equipment will be left to the discretion of the Supervisor. In most cases, the blocks should not be used because impaired disconnect clearances are such as to create a hazard when hanging and removing blocks. Also, for inside locations where blocks would normally be hung on hot blades, the spacing is not sufficient to prevent a flashover between blocks.

413. Boom Cranes

Boom cranes shall be grounded and a checker provided when working near energized high-voltage lines or buses in stations. Transmission and Distribution overhead line trucks are excluded from coverage herein.

414. Hydrogen-Cooled Synchronous Condensers and Generators

a. There shall be no smoking in or around hydrogen machines, hydrogen equipment, or in the pits of synchronous condensers.

Check first and be sure.

b. Precautions shall be observed on all leaks and repairs made as soon as possible. Periodic checks shall be made of hydrogen usage for an indication of leakage.

c. Valve covers shall be in place on hydrogen cylinders at all times when not in use. Cylinders shall be secured to prevent falling or rolling at all times.

d. When changing oil in bearings with hydrogen in the machines, the oil shall be first drained into open containers.

e. Hydrogen purity must be kept within safe limits.

415. Filling or Evacuating Hydrogen From Synchronous Condensers and Generators

a. Purging and filling a machine with hydrogen shall be done in accordance with detailed written instructions.

b. A qualified employee must be present at all times during the operation.

c. A suitable area adjacent to the machine shall be roped off and "No Smoking" signs posted. No smoking or open flames shall be permitted in this area.

d. Only persons actually required to perform filling or evacuating operation shall be permitted inside of the roped-off area.

e. All hydrogen cylinders shall be disconnected from the header, or the spool shall be removed from the supply line, prior to removing the hydrogen from the machine and shall remain disconnected until completion of the inspection or overhaul and the air has been removed from the machine. Hydrogen or air must be removed from the machine by either purging with CO2 or vacuum evacuation.

Section 500
HYDRO RULES

501. These Rules Shall Apply to All Hydroelectric Generating Stations

Rules pertaining to switching and electrical clearances are covered in the Switching and Clearance Section. Rules pertaining to electrical maintenance and operation are covered in the Substation Section. These and all other sections that apply to Hydro operation and maintenance shall be followed by Hydro Generation personnel.

502. Primary Operations and Duties

a. Equipment in Service. All equipment shall be considered in service unless properly cleared and tagged.

b. Clearance Procedures. Where applicable, approved written clearance procedures shall be followed before working on or entering station equipment. No employee shall work on equipment that has been cleared for work unless the employee holds a clearance or is working under another employee who holds such clearance.

503. Contract Work

When a contractor is performing work in a station, a qualified employee appointed by the station chief or supervisor shall take necessary clearances and instruct the contractor (or authorized representative) in regard to hazards peculiar to the equipment or work location.

504. Watering or Unwatering Hydraulic Equipment

When filling or draining scroll cases, penstocks, conduits or other hydraulic equipment, Station Operating Instructions shall be followed.

505. Gauge Glasses

Fluid level gauge glasses shall not be replaced until the pressure has been relieved. The glass shall not be put back into operation until guards are in place.

506. Working in Wet Locations

When entering scroll cases, draft tubes, and other wet locations, only approved portable lighting equipment shall be used.

Only air-powered tools or hand tools shall be used in wet work locations, except that properly grounded portable electric tools may be used if special permission has been obtained from the supervisor in charge.

507. Gratings

a. When working on or above open gratings, a canvas or other suitable covering shall be used to cover the grating in order to prevent objects from dropping to a lower level.

b. When gratings are removed, standard guardrails shall be erected or the opening shall be constantly attended. Toeboards shall be installed where persons may pass underneath or there is moving machinery or equipment with which falling material could create a hazard.

c. Gratings shall be tied off, before removing, to prevent falling.

508. Reserved

509. Reserved

510. Entering a Turbine Scroll Case, Wheel Pit, Relief Valve, Draft Tube or Tailrace

Before entering any turbine water passage, the employee holding clearance shall check to assure that valves on all sources of pressure are closed, and that all drains, vent valves, wicket gates, or needle valves are open. The employee holding the clearance shall check to assure that the governor, controls, and all of the foregoing have been rendered inoperative. Special permission must be obtained from the supervisor in charge to enter wheel pits to inspect for needle valve leakage when a bypass valve is left open to maintain penstock pressure on the needle valve.

511. Entering a Penstock

Before entering a penstock, the employee holding the clearance shall check to assure that the upper penstock valve and all bypasses to the penstock are closed and that the lower penstock valve between the penstock and scroll case, all drain valves, wicket gates, or needle valves are open. The employee holding the clearance shall check to assure that the governor, controls, and all the foregoing have been rendered inoperative. Escape exits and ventilation shall be provided by removing manhole covers. The person holding the clearance shall be held responsible for all persons entering the penstock. Where plants do not have suitable shut-off facilities at the entrance of their penstocks, the water conduits shall be drained before entering the penstocks and Rule 512 shall prevail.

512. Entering a Water Conduit

Before entering a water conduit, the employee holding the clearance shall check to assure that all devices which may admit water to the conduit are closed and all drainage gates and valves are open, and that all of the foregoing have been rendered inoperative. The person holding the clearance shall be held responsible for all persons entering the conduit.

513. Snow Surveys

Snow surveys and other related hydrographic work under winter conditions shall be performed by two member parties whenever it is necessary for such employees to be away from their base overnight. They shall follow a predetermined route and shall not separate except in cases of extreme emergency.

Section 600
STEAM RULES

601. This Section Shall Apply to Steam Generation Station Operation and Maintenance

Rules pertaining to switching and electrical clearances are covered in the Switching and Clearance Section; rules pertaining to electrical maintenance and operation are covered in the Substation Section. These and all other sections that pertain shall apply to Steam Generation station personnel.

602. Working on Equipment

a. Equipment in Service. All equipment shall be considered in service unless properly cleared and tagged or designated as out of service.

b. Clearance Procedures. Where applicable, approved written clearance procedures shall be followed before working on or entering station equipment. No employee shall work on or enter any equipment that has been cleared for work unless the employee holds a clearance or is working under another employee who holds such a clearance.

c. Starting and Shutting Down Equipment. Prior to or during starting equipment, a check shall be made of all equipment, indicating devices and related controls essential to the operation of the equipment. Such equipment shall be operable and in proper adjustment for safe operation.

   Established procedures for starting up and shutting down shall be rigidly followed. Necessary deviations may be made with special permission and shall be recorded.

603. Boilers — Starting Up

a. A pre-firing check shall be made of all instrumentation, equipment, and controls essential to the operation of the boiler. All such equipment shall be operable and in proper adjustment for safe operation.

   There shall be water showing in the boiler drum gauge glasses.

   The boiler shall be thoroughly purged of flammable mixtures in accordance with approved Station Instructions, before lighting fires.

b. An approved torch or ignitor shall be used for lighting fires in a boiler. The person handling the torch shall keep clear of opening into which lighted torch is placed. Ignitors shall be checked and monitored to be burning before burners are placed in service.

   Under no condition shall burners be lighted from hot brick work. In case of unstable fires or loss of fires in a boiler, fuel valves shall be closed and the boiler thoroughly purged before lighting fires again. Continual monitoring of fires shall be maintained until stable fires are assured.

604. Boilers — Operating

a. Loss of fires shall be considered an emergency. The fuel supply to the affected boiler shall be cut off immediately. Before relighting, it must be assured that all combustible gases are purged, in accordance with written established instructions.

b. Before making observations of boiler firesides that involve opening doors or close approach to openings, authorization shall be obtained from the operator in charge, established precautions must be taken, and suitable eye protection used. Sufficient aspirating air shall be applied before opening observation doors on a pressurized furnace.

c. Return and supply valves shall be closed before removing a burner gun.

   Employees handling hot burner guns shall wear clothing with full length sleeves rolled down, face protection, and protective gloves, mittens, pads, or other approved protection.

d. Prompt action shall be taken when either abnormally high or low boiler water level exists, and the supervisor shall be notified as soon as practical.

e. Prompt action shall be taken when firing conditions indicate possible burner failure, flame instability, insufficient or excess fuel or combustion air, and shall be reported as soon as practical.

f. Boiler inspections shall be made as frequently as necessary to ensure against formation of clinkers, run backs, and windbox fires.

g. Inspections of fuel oil equipment and adjacent areas thereto shall be made periodically to check for oil leaks and drips. Fuel oil shall not be allowed to soak into heat insulation and cause a fire hazard. Oil spills shall be cleaned up without delay.

605. Boilers — Out of Service

a. Employees shall not enter firesides or watersides of a boiler until a boiler clearance is obtained. Entering the boiler for inspection will not be done until the person holding the clearance is notified or a separate clearance is obtained.

b. Precautions shall, in accordance with approved Division Orders and Operating Instructions, be taken to prevent fuel leaking into a furnace following shut down.

606. Hydrostatic Testing

All waterside clearances shall be released before hydrostatic testing a boiler.

During hydrostatic testing of boilers, only specifically authorized persons shall be permitted to enter the boiler

setting. Boilers being tested in excess of normal pressure shall not be entered until test pressure has been attained for 15 minutes.

607. Gauge Glasses

Employees shall not work on gauge glasses until pressure has been relieved. Gauge glasses shall be pressurized carefully, and only when everyone is clear or protected from possible failure.

608. Gratings

a. When working on or above gratings, a canvas or other suitable covering shall be used to cover the grating in order to prevent objects from dropping to a lower level.

b. When gratings are removed, standard guardrails shall be erected or the opening shall be constantly attended. Toeboards shall be installed where persons may pass underneath or there is moving machinery or equipment with which falling material could create a hazard.

c. Gratings shall be tied off, before removing, to prevent falling. (Read Rule 608.)

609. Water or Steam Spaces

a. Before water or steam spaces of equipment are entered, adequate drainage and ventilation shall be accomplished.

b. Only approved lighting equipment shall be used. Electric tools shall not be used for condenser or boiler work, except that properly grounded portable electric tools may be used if special permission has been obtained from the employee in charge.

c. No one shall be allowed to work at the opposite end of condenser tubes being cleaned. While cleaning is in progress, the opposite end of the tubes shall be barricaded and posted to keep personnel clear. No one shall look into tubes immediately after cleaning.

610. Reserved.

611. Pressure Hose

Air and water hoses shall not be used for steam. Pressure shall be released from any hose before disconnecting.

612. Turbine Generators

a. Prior to starting up, all equipment, instrumentation, and controls essential to the operation of the unit shall be checked. All such equipment shall be operable and in proper adjustment for safe operation.

b. Periodic checks shall be made to locate and control lubricating oil leaks. Leaks near the turbine or steam lines shall be considered emergencies, and reported and corrected as soon as practical.

c. Collector ring or exciter brushes shall not be changed with the equipment in service except with permission of the employee in charge, and in accordance with approved station procedures.

613. Control Boards

All control, annunciator, and indicating light circuits in back of control and gauge boards shall be considered as energized.

Employees working in back of these boards shall use precaution to guard against contact with exposed, energized parts.

Caution shall be exercised when disconnecting, blowing down, or draining gauge lines to prevent contact with exposed electrical equipment.

614. Fuel Gas Lines and Regulators

a. All gas lines shall be properly identified. "No Smoking" signs shall be posted around control equipment and in areas subject to gas leakage. Large areas may require "No Smoking" signs where pressure controls use gas for operating power.

b. Gas lines shall be properly purged when practical and the line tested for combustible gases before work is started. Use inert gas for purging. Air shall not be used to purge gas lines. Red and white barrier tape shall surround the area and "No Smoking" signs posted. The line shall be frequently tested as a check that no isolation valves are leaking through.

c. Welding or hazardous work on pressurized gas lines not purged shall be performed in accordance with approved detailed written procedure for the specific job and under the supervision of a qualified person. Tools, buffers, and saws that will not cause sparks shall be used around gas equipment.

d. Gas lines and headers not in use shall be vented in such a manner that a combustible mixture will not accumulate or circulate so the mixture may become ignited and cause an explosion.

e. In the event of a gas fire, it is safer to allow the gas to burn until the source is cut off than to extinguish the flame.

615. Chemical Cleanings

During chemical cleaning, areas where acid is being mixed or vented shall be barricaded and posted, and smoking shall not be permitted. No work shall be done inside the boiler or windbox during chemical cleaning. Work and welding is permissible in well-ventilated areas as determined safe by the person in charge.

Suitable procedures shall be established to avoid explosions from evolved hydrogen or injuries from the chemicals.

616. Reserved

617. Station Clearance Procedure

a. The operator in charge shall have the equipment cleared for work by ordering the necessary valves, doors, fuses, switches, etc., opened or closed, as the case may be, so that equipment is unwatered, disconnected, depressurized and drained, or otherwise made safe for persons to work.

b. Every source from which steam, water, gas, oil, air, electricity, etc., might enter the equipment shall be checked and every such source eliminated.

c. When all valves, doors, switches, fuses, etc., have been closed, opened, pulled, or blocked, locks or "PERSONNEL AT WORK" tags shall be properly placed by the operator to ensure that isolation equipment will not be operated.

   The preceding are the minimum requirements for establishing station clearances. Other procedures and methods may be utilized to further ensure the safety of personnel and equipment.

   Clearances may then be issued when the equipment is drained and at zero pressure.

d. All valving, switching, and other operations performed to clear the equipment shall be specifically stated when reporting to the operator in charge by the person or persons to whom the instructions were given. Equipment used for isolation shall be logged by the operator, with names of persons performing the operations and the time the transaction was completed.

e. When issuing a clearance, the operator shall clearly state to the person receiving the clearance what valves, doors, switches, fuses, etc., are open or closed and that the equipment is isolated and/or at zero pressure, drained, and cleared for work. The piece of equipment shall be correctly and definitely specified and shall be given its proper designation, and all points between which clearance is given shall be specifically named. The person receiving the clearance shall carefully and accurately repeat it back so there is a mutual understanding of the status of the equipment and the limits of the clearance. The operator shall log the clearance in red, stating _____ (giving name) has a clearance on such piece of equipment, and the red clearance tag number when used. The person receiving the clearance shall sign the log where possible. When writing up the clearance in the log, always enter the names of all parties on a new line, below those lines used to record the clearances. This will leave room to enter the word "clear," and the time and names, with blue pencil, after the clearance is released. Only the two names will appear under the clearance of the person receiving and the person issuing the clearance.

618. Prior to Restoring Equipment to Service

Before restoring equipment to service, the supervisor in charge or the operator shall ensure the following has been performed:

a. That all clearances have been released.

b. That all "Clearance" and "Personnel at Work" tags have been removed from equipment used for isolation.

c. That a thorough inspection has been made with a statement of all work completed.

d. That tests have been performed where necessary.

619. Red "Clearance" Tags

In addition to the logging procedure as prescribed in Rule 617, a red "Clearance" tag shall be properly filled out for each clearance issued on a particular piece of equipment

After the operator issuing the clearance has properly filled out the red "Clearance" tag and signed it, the person receiving the clearance shall sign the tag (received by _____).

The person issuing the clearance shall then give the stub to the person receiving the clearance, who shall retain the stub until the clearance is formally released. The operator issuing the clearance shall then place the upper portion of the red "Clearance" tag on the controls of the equipment cleared for work when possible, otherwise, on an appropriate location in the control room.

Red "Clearance" tags shall be serially numbered and each released stub shall be matched both by name and by serial number with its parent tag before the parent tag is removed from the controls. Parent tags shall be removed immediately after the clearance is released, except when a clearance on the same equipment is to be transferred to another person. In this case, the same parent tags shall be used and a new stub made out and stapled to the original parent tag and stub. The same numbers and "Personnel at Work" tags as the original clearance will continue to be used.

No piece of equipment shall be returned to service until all tag stubs have been formally released and matched with their parent tags.

NOTE: "Clearance" tag serial number shall be written in parentheses and inserted in the red clearance log entry.

The preceding are the minimum requirements for establishing station clearances. Other procedures and methods may be utilized to further ensure the safety of personnel and equipment.

620. Red "Personnel at Work" Tags

These tags shall not be confused with the red "Clearance" tags and shall not in themselves constitute a clearance on the equipment.

They shall be used with clearances and permissions and placed at each point of isolation where the operation of a valve, gate, door, switch, etc., would permit steam, oil, water, gas, electricity, or other injurious substances to jeopardize personnel. (See Rule 617 c.)

All "Personnel at Work" tags shall be removed after all clearances have been released and before the equipment is returned to service.

621. Yellow "Caution" Tag

The yellow "Caution" tag is to be used to mark any equipment such as valves, gates, doors, machines, switches, etc., which for some special reason must not be operated or changed except upon specific instructions from the supervisor or operator in charge.

This tag shall not be used in place of the red "Clearance" tag or the red "Personnel at Work" tag and does not constitute a clearance on the equipment to which it is attached.

Section 700
SWITCHING AND CLEARANCE RULES

701. Scope and Purpose

These rules shall apply in all instances where work is to be performed on lines or equipment as specified in Rule 105.

Personnel issuing or receiving clearances shall be adequately trained and familiar with these switching and clearance rules, as well as other safety requirements that pertain to their assignment.

The purpose of these rules is to establish uniform safe operating and clearance procedures for working on lines or equipment. Clearances are used for protection of personnel only, and not for protection of equipment.

In addition to these rules, System Operating Bulletins pertinent to system operating and clearances shall be followed.

702. System Operating

The operation of the system is done through the Grid Control Center and certain substations designated as Switching Centers.

703. Switching Centers

Each Switching Center is a part of the Transmission/ Substation Division or the Hydro Generation Division, and is under the supervision of the Grid Control Center in matters pertaining to system operation only.

704. Authority and Responsibility of the Grid Control Center, Switching Centers, and Field Personnel

a. Procedures

Except in trouble and emergencies, where it is necessary to maintain service or protect life or property, no water conduit, pipeline, turbine, generator, circuit breaker, synchronous condenser, transmission or distribution line, control channel, power transformer, or similar equipment shall be put in service or taken out of service, nor any switching be done on 2.4 kV or higher voltages, with an exception of a distribution tap line (DTL), without approval having first been obtained from the Grid Control Center, Switching Center, shift supervisor, or the manager (or his/her authorized representative) having jurisdiction. Approval shall be obtained from the Grid Control Center, Switching Center, or shift supervisor before any work is done on any relay, control wiring, or auxiliary equipment which in any way affects, or through an accident or mistake might affect the ability to generate and transmit power; or before making any automatic equipment nonautomatic (solid) on 2.4 kV or higher voltages.

b. Expedite Resumption of Service

In order to expedite the resumption of service in time of emergency or abnormal system conditions, all personnel will be subject to orders issued from the Grid Control Center during the period of the emergency. The Grid Control Center may request any supervisor to send any available and qualified person to perform work in other than their own districts, divisions, or departments. Department or division heads shall be notified by the Grid Control Center of any such unusual assignment of personnel.

c. Emergency Operation

Whenever necessary for protection of life or property, or when communication is interrupted, or at times of serious disaster, any qualified worker may have lines or equipment de-activated or de-energized, provided such action is necessary, safe, and in the best interest of the Company or its customers. Such emergency operation shall be reported to the Grid Control Center or Switching Center as soon as possible with all details. The facts and names of all personnel concerned are to be logged in detail.

d. Working, Testing, or Switching in Stations

Approval shall be obtained from the Switching Center, or shift supervisor before any testing, switching, or other work is done in any station enclosure. The manager (or his/her authorized representative) having jurisdiction will determine the necessity of providing a qualified person for checking such work. The Switching Center or shift supervisor shall be notified after the work is completed. In the case of a "supervisory" controlled station, the Switching Center shall keep the controlling station informed.

e. Relationship Between Customer Service Districts and Switching Centers

The district operations superintendent (or his/her authorized representative) is responsible for the operation of all distribution circuits in the district; however, jurisdiction for switching and clearances on distribution circuits is normally delegated by the district operations superintendent (or his/her authorized representative) to the Switching Centers. All switching on distribution circuits and equipment within stations shall be approved by the Switching Centers.

The Switching Centers shall keep the district informed of any change or contemplated change in the status of a distribution circuit which in any way affects the normal operation of a circuit under its jurisdiction. The district shall also inform the Switching Center of any such change or contemplated change.

Where Switching Centers are not assigned jurisdiction of certain distribution lines or equipment, the district organization has the authority and responsibility in regard to switching and clearances on such lines and equipment.

f. Stations

The manager (or his/her authorized representative) having jurisdiction over the division or facility is responsible for the operation of the substations or generating stations in their jurisdiction.

The district operations superintendent (or his/her authorized representative) is responsible for those stations in the district operated and maintained by the district.

705. General Procedures to Clear Electrical Lines and Equipment for Work

a. De-Energizing

The Grid Control Center, Switching Center, or shift supervisor shall have the line or equipment de-energized by ordering circuit breakers, or other devices to be opened by which the line or equipment might be energized.

b. Check Every Source of Supply

Every source from which the line or equipment might be energized shall be checked and every such source eliminated. This applies to lines with paralleling taps or connections to more than one station, transformers, generators, circuit breakers, buses, potential sources, capacitors, and similar equipment.

On transmission/distribution circuits, all open field switches, disconnects, and branch line fuses on the line section to be cleared for work shall be visually checked and tagged.

c. Grounding Lines and Equipment in Stations

Prior to grounding, lines or equipment shall be tested for the indication of voltage with an approved testing device at an accessible location. Where such testing is impractical due to inaccessibility, a visual inspection and status confirmation with the Switching Center having jurisdiction shall be made.

When the proper disconnects have been opened, as specified in Rule 710, protective grounds shall be applied to the line or equipment by one of the following methods:

1. Where provided, station-ground disconnects shall be used to ground lines or equipment.
2. Where station-ground disconnects are provided, but are temporarily unavailable, the use of approved temporary grounding devices as station grounds requires approval of the Grid Control Center or Switching Center. On order of the Switching Center having jurisdiction, after proper clearances have been obtained, such grounds shall be applied or removed by a person designated as qualified by appropriate supervision.
3. Where station-ground disconnects are not provided, it is permissible to issue a Clearance on a cleared line or a piece of equipment with the fact stated that no station-ground disconnects are applied.
4. It shall not be permissible to substitute for the use of an approved temporary grounding device by connecting a line or piece of equipment to another ground by closing a circuit breaker or disconnects.

d. Switching Reported and Logged

Switching operations shall be reported to the Grid Control Center or Switching Center by the person to whom the switching orders were given, and logged by the person and by the operators concerned with the exact time of each transaction, and the names of all personnel involved.

When clearances are to be issued on lines, the Switching Center or Grid Control Center shall state to all the station operators concerned, after they report completion of the switching, "There will be personnel at work on the (Line Name)." This will be the authority for the station operator to place "Personnel at Work" signs or tags on the proper switch-handles or controls, etc., and enter in red in the log that personnel are working on the designated line. Such signs or tags are not to be removed except on the order of the Grid Control Center or Switching Center, and then only after the Grid Control Center or Switching Center has verified and stated that, "All personnel are clear of the (Line Name)" and this statement has been entered in the log in blue.

e. Whenever a line, line section, or equipment is cleared for work, a clearance shall be issued within a reasonable period of time.

706. Clearances

Definition. A clearance is the formal authorization, officially issued to a qualified person, at that person's request, to work on an electric line or some piece of operating equipment which is inherently too hazardous to work on while in service, and has been de-activated or de-energized, in a prescribed manner and placed in a safe condition to be worked on.

This authority carries with it a statement of the status of the line or equipment and is a guarantee that this status will not be changed in any way which might be detrimental to the safety of personnel.

707. Qualified Personnel

a. Personnel issuing or receiving a clearance shall assure themselves that the line or equipment has been properly de-activated or de-energized. Any person receiving a clearance for work shall familiarize themselves with the line or equipment to be worked on, its surroundings, and any possible hazards.

b. Only qualified personnel shall be issued a clearance on any line or piece of equipment.

c. Except as noted in paragraph d., the only person qualified to take a clearance for work inside a station from an operator, shift supervisor, or station electrician on duty at that station is defined as a person who has been designated as qualified by the division manager (or his/her authorized representative) having

jurisdiction. Personnel who are to perform work that requires a clearance inside a station shall work under a clearance which has been issued to a qualified person.

d. Local rules for the division to which the station is attached may permit the issuance of a station clearance to a qualified person from another division or department.

EXCEPTION: When construction work is in progress at Steam Generation stations, contractor personnel may be permitted to receive clearances when authorized to do so by the station with approval of the Steam Generation division manager (or his/her authorized representative).

708. Issuing Clearances

a. Formal Statement of Status

When issuing a clearance, the Grid Control Center, Switching Center, operator, or acting operator shall state clearly to the person requesting the clearance, what field switches, circuit breakers, disconnects, and secondary switches, etc., are open, where protective grounds, if any, are applied, and that the line or piece of equipment is de-activated or de-energized.

b. Accurate Identification

All lines and equipment shall be identified by the use of their correct name. In the case of a line, it must be given its proper designation, and the terminals between which the line has been cleared for work shall be specifically named.

c. Repeating and Logging of Clearances

The person receiving the clearance shall carefully and accurately repeat it back so as to assure that there is a mutual understanding of all the conditions, limits, and provisions of the clearance as issued. The Grid Control Center, Switching Center, or acting operator shall log the clearance in red, stating that such person (giving name) has a clearance on the specified line or piece of equipment. Where possible, the person receiving the clearance shall sign the log book entry.

d. Multiple Clearances

As many qualified personnel as necessary may obtain individual clearances on a line or piece of equipment, and each person shall exercise the same precaution and follow the same procedure in obtaining and releasing the clearances as though they were the only one obtaining such a clearance.

e. Clearances to Work at Attended Stations

Any qualified person desiring a clearance for work on equipment inside an attended station shall report to the operator in charge, shift supervisor, or station electrician on duty. After explaining what is to be done, the person shall request and receive the clearance in the prescribed and formal manner.

f. Clearances to Work at Unattended Stations

1. Clearances to work on equipment at unattended stations shall only be issued to qualified personnel.
2. A qualified person desiring a line clearance at an unattended station shall make the request to the Switching Center having jurisdiction of the station. In the case of an unattended generating station, the request shall be made to the supervisor in charge of the station (or their authorized representative). These requests should be submitted at least 24 hours in advance.
3. Clearances shall be formally logged before work is started, and released before the equipment is energized.

709. Releasing and Transferring Clearances

a. Formal Release

Each person holding a clearance shall make a personal inspection of the job location before releasing the clearance, and verify that all personnel working under their clearance have completed their work before releasing the clearance. All clearances shall be released in a formal manner.

1. Releasing "Ready for Service"

Upon completion of work, the person holding the clearances shall remove any personal shorts and grounds, which they attached, or authorized to be attached, to lines or equipment. When this has been done, the person releasing the clearance shall report to the Grid Control Center, Switching Center, station operator, then on shift, wherever the clearance was obtained. Personnel releasing clearances shall first give their name and shall then state what they are clear of (line or equipment) and that all their personal shorts and grounds have been removed, and that the line or equipment "is" ready for service, so far as they are concerned, with a complete statement of work completed.

2. Releasing "Not Ready for Service"

If the line or equipment "is not" ready for service, the person holding the clearance shall remove any personal shorts and grounds, which they attached, or authorized to be attached, to lines or equipment. When this has been done, the person releasing the clearance shall report to the Grid Control Center, Switching Center, station operator, then on shift, wherever the clearance was obtained. Personnel releasing clearances shall first give their name and shall then state what they are clear of (line or equipment) and that all their personal shorts and grounds have been removed, and that the line or equipment "is not" ready for service. A complete statement of its status and condition shall be reported at this time. The complete report shall be repeated back and the release of the clearance, with status, shall be recorded.

b. Direct Personal Release

Any clearance shall normally be released directly by the person to whom the clearance was issued. If at any time this is impossible due to an accident or any other cause, the line or equipment shall be patrolled or inspected, by another qualified person and the clearance released, before it is energized or re-activated.

The Grid Control Center, or Switching Center shall be assured that the patrolling or inspection has been adequate, and will thereafter require that the manager (or his/her authorized representative) having jurisdiction verify that it is safe to have the line or equipment returned to service.

c. Changes on Lines or Equipment

Whenever changes of other than routine nature are made on lines or equipment during work under a clearance, the person holding the clearance shall be held responsible for reporting all such changes when the clearance is released. The Switching Center shall then log all such information and notify the Grid Control Center.

d. Transferring Clearances

If a qualified person holding a clearance to work on lines or equipment desires to transfer the clearance to another qualified person, the person holding the clearance shall call the Grid Control Center, Switching Center, or station operator and report that it is desired to transfer the clearance to a second qualified person, giving the second person's name. The second person shall then take a clearance on the line or equipment, after which the first person shall release the clearance. (Personal grounds shall be transferred at the same time if still applied.) The second person shall then be responsible for releasing the clearance on the line or equipment at the completion of the work.

In cases where the Grid Control Center or Switching Center transfers a clearance at an unattended station from one operator to another, both operators shall be notified and the Grid Control Center or switching center shall log the transfer.

710. Clearance Procedures for Lines and Attached Stations Equipment

a. It shall be clearly understood that any line clearance constitutes a clearance on the entire line, line section and attached station equipment.

b. Any station-line work requiring personnel to perform work in a station-rack, cubicle or metal-clad enclosure shall require the continuous presence of a qualified checker as required in Rule 408.

c. A person holding a line clearance may issue authorization to other qualified personnel to work under the clearance, but the person holding the clearance shall be responsible for the line and equipment being clear and ready for service before releasing the clearance to the Grid Control Center or Switching Center.

d. A clearance will not be issued for:

1. sectionalizing, or
2. isolating, or
3. clearing the problem on line

EXCEPTION: With specific approval of the manager or his/her authorized representative having jurisdiction.

The cause of the problem must be located, its nature reported and a crew made available to make repairs before a clearance is issued.

NOTE: It shall be understood that until a clearance is issued, any line may be energized at any time, and without notice to personnel.

e. Line clearances shall be issued by the Grid Control Center or Switching Center only to qualified personnel. Switching Center operators shall transfer outstanding clearances at the end of the shift.

f. At stations where disconnect switches are provided on the bus-side of the circuit breakers, all line and bus-side disconnect switches shall be opened, and where provided, the station line ground disconnects shall be closed, before a line clearance is issued. Such a clearance will allow work to be performed on the line, line circuit breaker(s) and any equipment attached to the line at the station.

g. At station where bus-disconnect switches are not provided for the circuit breaker, the clearance shall not include the line-circuit breaker(s) and shall be stated and logged when the clearance is issued.

NOTE: In metal-clad or cubicle installations where facilities are provided to "rack-out" the circuit breaker, this operation will be the equivalent of opening disconnects to the circuit breaker.

h. When a line clearance is held which includes the circuit breaker(s), no circuit breaker(s) on that line or line section, shall be operated, nor shall any work be done on the control circuit to such circuit breaker(s) without first obtaining approval from the person(s) holding the clearance.

i. When work is to be performed in a station where a line clearance is required, that is not under the direct jurisdiction of a Switching Center or the Grid Control Center, the following procedure shall apply after the equipment has been cleared for work:

1. The field crew will open a switch where provided, or taps at a suitable location, such as the pothead pole if an underground circuit is involved, or at the first available pole outside the station if an overhead circuit is involved. A suitable sign shall be posted at the location of the open switch or taps to indicate that work is being performed at the station.
2. The field crew shall notify the Switching Center concerned of what has been done to clear the line, or line section.

NOTE: See System Operating Bulletin Number III for further information on this rule.

711. Clearance Procedures for Station Equipment

a. Working on Circuit Breakers

1. If it is desired to work on a circuit breaker, the Grid Control Center or Switching Center shall order the appropriate disconnect switches opened. The operator shall then issue a clearance on the circuit breaker, and it may be operated as necessary. If bus-side disconnect switches are not provided, the entire bus or section of the bus to which the circuit breaker is connected shall be cleared for work. The operator shall then issue a clearance on the circuit breaker and bus or section of bus cleared. The circuit breaker may then be operated as necessary.
2. On installations where bus-side disconnects are not provided, a clearance shall not be issued to work on the circuit breaker only. Approval may be granted to a person to work on the circuit breaker "CONTROL CIRCUIT," but such approval shall not constitute a clearance on the circuit breaker or approval to operate the circuit breaker.

b. Working on Buses and Their Connected Circuit Breakers

When a bus is to be cleared for work, line, bank, position, bus and/or transfer bus disconnects shall be opened to all positions and ground disconnects closed to the bus where provided.

The operator will then issue a clearance on the bus. The operator shall designate in the clearance those circuit breakers connected to the bus which are included or are not included in the clearance.

c. Work on Station Disconnects

If it becomes necessary to operate station line, bank, position, transfer bus section, or ground disconnects for repairs after the line or equipment has been cleared, grounded, and proper clearances issued, the following shall apply:

1. A complete explanation shall be made to, and authorization obtained from, the Grid Control Center before starting work on all transmission voltages of 33 kV and above. On distribution voltages of 33 kV and below, the Switching Center having jurisdiction is authorized to grant approval after receiving a satisfactory explanation of what is to be done.
2. At the completion of the work, the Grid Control Center or the Switching Center operator shall verify that all sets of disconnects worked on are restored to the same open or closed position they occupied before the work was started, and shall check as removed any temporary grounds which were applied.
3. Where disconnects are to be operated, there shall be at least one set of open disconnects between the disconnect to be worked on and all energized buses, lines, or other equipment.
4. Where station-ground disconnects are to be operated, approved-temporary grounds shall be installed before the station ground disconnects are operated or disturbed. The temporary grounds shall not be disturbed until the station ground disconnects have been reclosed.

d. Telephone Clearance on Station Equipment

Under certain special conditions such as testing, where the same equipment is to be energized and de-energized with intervening station clearances issued for adjustments, it is permissible for a qualified person to receive clearances from, and release clearances to the station operator by telephone.

712. Procedures to Restore Lines or Equipment to Service After Completion of Work

a. Lines

After every person holding a clearance on a line has released his/her clearance and reported the line is ready for service, the Grid Control Center, or Switching Center will proceed to return it to service.

1. If the line involved is a transmission line, approval shall be obtained from the Grid Control Center before issuing switching orders to return the line to service.
2. Notify the operator at the station or stations where the switching is to be done that: "All personnel are clear of (Line Name)." The operator will then enter in the log in blue that, "All personnel are clear of (Line Name)," and remove all "Personnel at Work" signs from the line involved.
3. Order all required secondary switches closed, grounds removed, and disconnect switches closed.
4. Order the necessary switching to return the line to service.

b. Station Equipment

After every person holding a clearance on a piece of equipment has reported clear and that the equipment may be returned to service, the station operator shall notify the Grid Control Center or Switching Center having jurisdiction and request approval to perform the necessary switching to prepare the equipment for service. The Grid Control Center or Switching Center having jurisdiction will either order that the equipment be returned to service or be made ready for service, depending upon the system operating conditions.

713. Declaring Out of Service

a. General

In general, no line, section of line, substation, or piece of electrical equipment under the jurisdiction of a Switching Center or the Grid Control Center may be declared out of service until cleared for work, and proper clearances issued. In order to be declared out of service, it will be necessary to open and tie back jumpers or the line otherwise cut at the station dead-end rack, in the station yard, or at some convenient

location outside the station that will disconnect the line, section of line, substation, or piece of electrical equipment in such a manner that it cannot be energized by normal switching procedures, at which time it may be declared out of service between this point and some other location, such as the end of the line or a field cut. (Refer to System Operating Bulletin No. 25 for further explanation of this procedure.)

b. Clearances shall not be issued by Switching Centers or the Grid Control Center on lines or equipment which have been declared out of service.

714. Declaring in Service

a. New Lines

A new transmission line, or new distribution line above 2.4 kV shall not be connected to the risers in a station rack, nor connected to an in-service line in the field (except for distribution tap lines), until the line or line section has been released for jurisdiction to the Switching Center or Grid Control Center. The line connections shall then be made under clearance procedures. (Refer to Underground Rule 303 b. and System Operating Bulletin No. 25 for further explanation of this procedure.)

b. New Stations

Prior to making any line connections which could later be used to energize a new station, the station shall have been released to the jurisdiction of a Switching Center and the Grid Control Center. The line connections shall then be made under clearance procedures.

New equipment connections shall not be made within a station where new or out-of-service equipment might be energized by normal switching procedures, until this equipment has been released for Switching Center jurisdiction. Connections shall then be made under clearance procedures. (Also refer to Underground Rule 303 b.)

c. New Equipment

Connections shall not be made within a station where new or out-of-service equipment might be energized by normal switching procedures, until this equipment has been released for Switching Center jurisdiction. Connections shall then be made under clearance procedures. (Also refer to Underground Rule 303 b.)

Section 800
NUCLEAR RULES

801. Personnel Responsibility at Nuclear Generating Stations

a. Exposure Control

1. Personnel exposure to radiation is to be maintained As Low As Reasonably Achievable (ALARA) at all times.
2. Smoking, eating, drinking, gum or tobacco chewing are prohibited in Radiologically Controlled Areas (RCAs).

802. Area Classification and Designation at Nuclear Generating Stations

a. Restricted Area (RA) is an area where access is controlled for the purpose of radiological safety.

b. Radiologically Controlled Area (RCA) is an area where extended controls are specified for the purpose of radiological safety and in which a Radiation Exposure Permit (REP) and dosimetry is required for entry.

c. Radiation Area is an area where the dose rate is above 5 mrem/hr, 30 cm from a radiation source.

d. High Radiation Area is an area where the dose rate exceeds 100 mrem/hr at 30 cm from a radiation source.

e. Airborne Radioactivity Areas are normally posted at concentrations of 30% or more of a Derived Air Concentration (DAC).

NOTE: If you work in a 30% DAC atmosphere for one year, you will receive 30% of the annual dose limit.

f. Contaminated Area is an area where loose surface contamination levels are equal to or greater than 1,000 disintegrations per minute per 100 cm2. Most contaminated areas fall into one of three categories:

1. General Areas — Defined by rope or tape barriers.
2. Localized Areas — Found on pumps, valves, wall-mounted components and small areas of floors and/or walls.
3. Contaminated Sumps — Posted as "Contaminated area inside sump."

803. Radiological Warning Signs and Barriers

a. The radiation designation colors are yellow and magenta. This color combination or the color magenta alone, shall be used only in conjunction with the identification and control of radioactive sources or radiation areas.

The radiation symbol is shown above. The symbol is magenta (or purple or black) on a yellow background.

b. Radiation areas shall be conspicuously posted with a sign or signs bearing the radiation symbol and the words:

CAUTION
RADIATION AREA

c. High radiation areas shall be conspicuously posted with a sign or signs bearing the radiation symbol and the words:

CAUTION
HIGH RADIATION AREA

Such areas shall be treated or equipped in accordance with Code of Federal Regulations, Title 10, Part 20.

d. Airborne radioactive areas shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION
AIRBORNE RADIOACTIVITY AREA

e. Contaminated areas shall be conspicuously posted with a sign or signs bearing the words:

CAUTION
CONTAMINATED AREA

f. Radioactive Material Areas (RMA) are areas or rooms designated for storage of radioactive material(s). RMAs shall be conspicuously posted with a sign or signs bearing the radiation symbol and the words:

CAUTION
RADIOACTIVE MATERIAL(S)

g. There are several types of barriers, depending on the radiological condition. The most common barrier is yellow and magenta plastic braided rope.

h. Radiological barriers and signs shall be erected or removed only by the authorization of Health Physics personnel.

804. Radiation Exposure Permit

a. Radiological Controlled Areas (RCA) shall be entered only by individuals who have obtained permission in the form of a Radiation Exposure Permit (REP).

b. Personnel shall comply with the requirements on the REP.

c. Personnel shall not deviate from the instructions of the REP.

805. Personnel Radiation Monitoring

a. Required monitoring devices shall be worn as directed by Radiation Exposure Permits, and shall only be removed at the designated location.

b. Personnel monitoring devices shall not be tampered with in any way.

c. If a monitoring device is lost, damaged, or alarms, exit the area immediately and notify Health Physics personnel.

806. Personnel Radiological Contamination Events

a. Contamination on any individual shall be removed under direction of Health Physics personnel, and in accordance with site procedures.

b. Contamination on personal clothing shall be removed under the direction of Health Physics personnel.

c. Personal clothing that cannot be decontaminated will be confiscated and disposed of as radioactive waste.

807. Radiological Protective Clothing and Equipment

a. Protective Clothing
   1. Protective clothing shall be worn in Radiological Controlled Areas as specified by the Radiation Exposure Permit.
   2. When leaving the Radiological Controlled Areas, protective clothing shall be removed according to posted instructions, and placed in the containers provided.
   3. Protective clothing shall not be worn outside the Radiological Controlled Areas.

b. Respirators
   1. Approved respirators shall be worn as designated by the Radiation Exposure Permit.
   2. Before being approved to wear a respirator, each employee must have training, a current physical exam, be clean-shaven in the facepiece-to-face seal area, and have a "fit test" on each type of respirator to be worn.

808. Emergency Plan Overview

a. There are four classifications of emergencies:
   1. Unusual Event (UE)
   2. Alert
   3. Site Area Emergency (SAE)
   4. General Emergency (GE)

b. If an Alert, Site Area Emergency, or General Emergency is declared:
   1. Sirens will be sounded. Unless directed otherwise, personnel shall report as follows:
      (a). Emergency Response Personnel should report to their Emergency Duty Stations (e.g., Technical Support Center, Operations Support Center, etc.).
      (b). Non-Emergency Response Personnel should report to an assembly area. Use proper Health Physics procedures when exiting the protected area. Follow the instructions of security officers and supervisors.

Section 900
GAS OPERATIONS — CATALINA ISLAND

901. Scope and Purpose

All work shall be arranged and carried on with a primary view to safety of the employee, customer, customer's property and the public welfare in general.

There follows, herewith, a general set of rules and specifications for this purpose, but which cannot possibly foresee the exact circumstances, which may be met.

To accomplish these objectives, all supervisors, foremen and workers are to be continually watchful and alert.

902. Turning On Gas

a. Gas service shall not be turned on unless the customer or another responsible party is on the premises and advises.

b. Before turning on gas service, house-piping outlets to which appliances are not connected shall be securely plugged or capped. All valves on appliances, which are connected, shall be observed in the "closed" position, except appliance main shut-off valves, which shall be left open.

c. After turning on gas, the meter shall be checked for ability to register a small flow and a meter test for leakage shall be made.

d. If movement of the meter test hand is observed, a soap test for leakage on the meter connection shall be made. If the leak is on the customer's side of the meter, the customer shall be notified and the meter turned off until the leak is repaired.

903. Investigation of Leaks

a. In the event of a hazardous leak or a leak suspected to be hazardous, the following procedure shall be followed.

   1. All burners and open flames in the building or where the escaping gas might reach shall be extinguished.
   2. Persons in the building shall be warned not to turn the lights off or on or use the telephone, doorbells, or any other electrical equipment. When possible and safe to do so, the electrical service entrance switch shall be opened or the service disconnected.
   3. All windows and doors which will help dissipate the gas shall be opened and a blower shall be used to dispel it.
   4. All areas where escaping gas will create a hazardous condition shall be vacated.

b. Where the hazardous leak is not repaired or stopped, a qualified employee shall stand by until repairs are made and the area is safe.

904. Pressure Relieving Valves

a. Pressure relieving valves shall be checked by authorized personnel in conformance with established schedules.

b. Valves located ahead of pressure relieving valves, for the sole purpose of enabling the pressure relieving valve to be taken out of service for inspection or repair, shall be locked in the open position.

905. Sources of Ignition or Fire Near Escaping Gas

a. When excavating over or near a leaking gas line, or doing any work which does or may involve escaping gas, except as provided elsewhere, all forms of ignition shall be kept upwind a safe distance. Static electricity as a source of ignition must be considered. Notwithstanding the preceding, backhoes, trenchers, or similar equipment, may be used to excavate near leaking gas when considered necessary and feasible by the Supervisor in charge.

b. Matches, lighters, or other sources of ignition shall not be carried by employees when entering or working in an atmosphere containing combustible gas, except that safety matches may be carried by Servicemen in the performance of their normal work.

c. Whenever a section of metallic gas pipe is to be cut, the line shall be blown down to atmosphere pressure and an approved metallic jumper shall be established across the point where the cut is to be made to prevent a spark or arc from occurring.

   EXCEPTION: Plastic pipe or two-inch smaller metallic gas lines, and gas meter swivels may be cut or disconnected without a jumper.

d. Pipe cutters shall be used whenever possible to cut metallic gas lines. When it is necessary to use a hacksaw or file in a gaseous atmosphere on metallic pipe, the tool shall be lubricated and handled carefully to prevent sparks. On plastic pipe, the tool shall be grounded.

e. Gas shall not be blown against the side of an excavation; it must be vented upward.

f. The employee in charge shall insure that bystanders and traffic are not allowed to remain near work in which gas is escaping or likely to escape.

906. "Man on Line" and "Caution" Tags

a. When a section of a main, or line, or piece of equipment involved in conveying gas, oil, steam or high pressure air is shut down or isolated by closing valves, a "Man on Line" tag shall be properly filled out and placed on each closed valve or mechanism which constitutes a clearance point.

b. Prime movers, machines or equipment which are capable of movement, shall be securely blocked or otherwise secured when there is a possibility of hazard to employees working on them. Lockable controls shall be locked in "off" position during repair work. Machines not equipped with lockable controls shall be sealed or disconnected from the source of power, or other steps shall be taken which will prevent the prime mover or machine from being started. In addition, "Man on Line" tags shall be placed at these locations.

907. Ventilation

When a space where gas leakage may be present is ventilated by means of a power driven fan or blower, the motor or engine shall be kept upwind at least 10 feet from the opening unless the motor or engine is explosion-proof. Blowers shall be placed so that they will not pick up exhaust fumes from other equipment or vehicles.

908. Unusual Hazards

a. Jobs involving unusual hazards shall be performed in accordance with specific instructions which shall include policing and frequent checking of such hazards. The exempt Supervisor or designated representative shall be directly responsible for the issuance of such instructions.

b. If the employee in charge determines a job to be unusually hazardous and that an observer will minimize such hazard, a qualified observer shall be checked.

c. Before employees start work, they shall make sure they are on the right equipment; if unusual hazards are involved, they shall insist on being checked.

909. Plastic Pipe Static Charges

Static electrical charges must be removed by grounding the pipe whenever it is squeezed and during hot tapping, purging and emergency repair operations.

Section 1000
FIRST AID RULES

1001. Purpose

First aid is the immediate care given to the victim of an injury or sudden illness until the arrival of qualified assistance. It includes self-help and home care if medical assistance is not available or necessary. In all cases where assistance is summoned to the scene of an accident, it must be done in accordance with the instruction in Policy Section P–14 What To Do When An Accident Occurs.

1002. General Directions

Prompt action must be taken in cases of serious injury or sudden illness while help is being summoned. Give immediate attention to the following first-aid priorities:

a. Begin prompt rescue if the victim is in imminent danger of further injury. Summon emergency medical service EMS (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) depending on the work location as quickly as possible — even if that means leaving the victim momentarily.

b. Ensure that the victim has an open airway and perform Cardiopulmonary Resuscitation (CPR), if necessary. (See Rule 1015)

c. Control severe bleeding.

NOTE: First aid responders should use universal precautions at all times — meaning that they should presume that exposure to blood or any other bodily fluid is potentially infectious. To avoid direct contact with blood or body fluids, first aid responder should use the appropriate personal protective equipment (PPE) to reduce the risk for exposure.

1003. Shock

a. Definition

Shock is a dangerous reduction of blood flow throughout the body tissues that, if untreated, may lead to collapse, coma, and death. The blood vessels become dilated and do not respond to nervous stimuli. If the state of shock continues over a period of only a few hours, it may be fatal or cause permanent damage to essential organs of the body. Shock is made worse by pain and anxiety.

1. Traumatic Shock: Injury-related shock, commonly called "traumatic shock," is decidedly different from electrical shock and other special forms of shock.

2. Electrical Shock: The result of contact with electrical current. A victim suffering from electrical shock must be removed from contact with the current. The first aid responder must use extreme caution in this procedure to avoid contact with the electrical current. If the victim cannot be safely removed from the source of current, the first aid responder must wait until qualified help arrives to remove the victim from the source of current. Breathing and the heart beat, or both, may cease to function with electrical contact; therefore, Cardiopulmonary Resuscitation (CPR) may be needed (See Rule 1015). Internal or external injuries may also occur.

b. Symptoms

1. The shock victim's behavior may range from a feeling of restlessness or agitation to stupor and unconsciousness.

2. The pulse rate will be weak or almost imperceptible; its rhythm may be regular or irregular.

3. Other physical symptoms may be:

   (a). The face may be pale or ashen.

   (b). The skin may feel cool and clammy with increased perspiration.

   (c). Pupils may be dilated or unequal in size and will lack luster.

   (d). Dizziness, nausea and vomiting may occur.

   (e). Unconsciousness may develop.

   (f). Breathing may be shallow or stop.

   (g). The heart may stop beating.

c. First Aid

It is vital to the victim that the first aid responder try to prevent or treat shock immediately with the following procedures:

1. Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately. Maintain an open airway at all times.

2. Maintain an open airway at all times.

3. Keep victim as comfortable as possible in an inactive position lying on back with legs slightly raised (unless leg or back injury is suspected).

4. Cover or uncover victim using clothing or blankets to maintain normal body temperature.

5. Do not give liquids or food.

6. Place victim on the side if nausea occurs to prevent choking on vomitus matter.

7. Do not move victim unless absolutely necessary.

8. Avoid rough handling if victim must be moved.

9. Do not let victim see the injuries, if possible.

10. Do not discuss the extent of injuries with victim.

1004. Wounds

a. Definition

A wound is a break in the body tissue, either internal or external.

1. Open Wounds: A break in the skin. There are six types of open wounds.

   (a). Abrasion: This occurs when the outer layers of the protective skin are damaged by scraping. There is limited bleeding, thus allowing foreign material to remain in the wound.

   (b). Incision: A clean cut by a sharp object. The bleeding may be rapid and heavy, cleansing the wound of foreign matter. Incisions are usually deep and may cause damage to muscles, tendons, nerves, and blood vessels.

   (c). Laceration: A lacerated wound is a jagged or irregular cut, characterized by a breaking or tearing of the soft tissues. Bleeding may be rapid and extensive with destruction of the body tissues due to the tearing action.

   (d). Puncture: A puncture wound is produced by an object piercing the skin, creating a hole in the tissue. External bleeding is quite limited with minor punctures; however, bleeding may be moderate to severe with large puncture wounds. Infection may develop easily, with the possibility of tetanus.

   (e). Avulsion: An avulsed wound results when tissue is forcibly separated or torn from the victim's body. An avulsed wound if completely removed is also termed an amputation. An incised or lacerated wound, or both, will usually occur when a body part is avulsed. There will be heavy and rapid bleeding. Any time this situation occurs, the avulsed body part should be sent along with the victim to the hospital. Wrap avulsed part in a cool moist dressing. Do not freeze.

   (f). Impaled Objects: Do not remove object from wound. If object protrudes from wound, stabilize or secure with bandage in place to prevent movement of object.

NOTE: Do not place patient on injured side.

2. Closed Wounds: Damage to underlying tissues without a break in the skin. Examples of these wounds are:

   (a). Contusions: Bruises, black eyes, etc.

   (b). Internal Hemorrhaging: Not readily evident in most cases. May involve damage to internal organs due to puncture wounds, impaled objects, or a traumatic impact.

3. Chest Wounds: An open or closed injury to the chest.

   (a). If a surface wound, stop bleeding with a pressure dressing.

   (b). If the wound extends into the chest cavity, cover opening with an airtight dressing, preferably the 24 x 72 inch gauze compress found in the First Aid Kit.

   (c). Place the victim with the injured side lower to assist breathing.

CAUTION: Do not tightly bind the chest, since this may hamper breathing. If patient is conscious, assist in finding the most comfortable position in breathing.

b. Symptoms

Bleeding: There are three types of bleeding the first aid responder will encounter. They are arterial, venous, and capillary.

1. Arterial: Bleeding from a cut artery occurs in spurts. The blood is bright red in color.

2. Venous: Bleeding from a cut vein can be recognized by the dark red color of the blood and the manner in which it wells or flows evenly from the wound.

3. Capillary: Capillary bleeding is the oozing of red blood, generally from an abraded surface. It may be severe, but can be readily controlled.

c. First Aid

Minor Wounds: All minor wounds that do not need medical attention should be treated as follows:

1. Cleanse wound thoroughly with soap and water (use antibacterial soap if available, avoid using detergent soap. Otherwise, copious amount of water is sufficient).

2. Apply antibiotic ointment if able to confirm that the victim is not allergic to it.

3. Place bandage or dressing over the wound.

4. Observe wound for signs of infection. If redness, pus, or fever develops, seek medical assistance.

d. Major Wounds: There are four methods used in the control of bleeding and should be used in the following order if possible: direct pressure, elevation, pressure point and tourniquet. The tourniquet is seldom used and only as a last resort.

1. Direct Pressure: Place a sterile compress directly over the wound and apply pressure. In an emergency, pieces of clothing, rags, or gloved fingers may be used. This method is the only available method to control bleeding on the head, face, and torso.

2. Elevation: Where direct pressure is used on extremities, control of bleeding can be helped by elevating the limb. Do not elevate limb if fracture is suspected or if victim has head, chest, or neck injuries.

3. Pressure Points: There are two locations on the body to use as digital pressure points:

   — Brachial artery-located on the inner side of the upper arm along the bone;

— Femoral artery-located in the groin area. Use heel of hand to apply pressure.

4. Tourniquet: Rarely used and its use is the risk of sacrificing a limb to save a life. A tourniquet may be applied to the arms or legs only. A tourniquet should be applied only when direct pressure on the wound, elevation of the limb, and pressure on the appropriate pressure point fails to stop the bleeding. Releasing the tourniquet increases the danger of shock, blood clots, and bleeding. Once the tourniquet has been applied, it should not be released except on the advice of a physician.

   Application: If the tourniquet in SCE First Aid Kit is used, follow the instructions on the box it comes in; if not proceed as follows:

   (a). Use a strip of cloth at least two inches wide, such as a folded triangular bandage. Do not use narrow materials such as rope or wire as these may damage the flesh.

   (b). Wrap the cloth or bandage tightly twice around the limb close to the wound, between the wound and the heart.

   (c). Tie one overhand knot in the bandage. Place a short, strong stick on top of the knot, and then tie two overhand knots on top of the stick.

   (d). Twist the stick to tighten a strip of cloth around the limb, until the bleeding is greatly reduced or stops. Wrap and tie in place another strip of cloth around the stick and limb so the tourniquet will not unwind.

   (e). Do not cover the tourniquet.

   (f). Attach a highly visible note on the victim indicating the location of the tourniquet and the time when applied. Place the note on the victim's clothing by the collar.

e. Dangers

1. Shock: When moderate to severe bleeding is present, first aid for shock should be started as soon as possible. (See Rule 1003)

2. Infection: Infection of a wound is characterized by tenderness, redness, warmth, swelling in some cases, and pus appearing on the wound. If infection develops, seek medical attention immediately.

1005. Fractures

a. Definition

A fracture is a broken bone. There are two types of fractures common to first aid responders: simple and compound.

1. Simple Fracture: In a simple fracture, the bone is broken but the skin in not broken. This fracture may not be obvious to the first aid responder, but the cause of the injury can be used as a guide. Simple fractures are most common and may be difficult to determine without the assistance of X-ray. If there is doubt, carry out first aid measures for a fracture to prevent aggravation of the injury.

2. Compound Fracture: In a compound fracture, the bone is broken and there is also a connecting wound usually caused by the bone breaking through the skin. Compound fractures carry an added danger of increased bleeding, infection and torn tissue. A fracture may be considered compound without an exposed bone. When an object strikes the skin surface and creates a wound if it is suspected that the underlying bone is broken, the fracture is compound.

b. Symptoms

Information provided by the victim can provide clues to possible fracture locations, such as hearing or feeling the bone break.

1. General symptoms for a simple fracture are:

   (a). Pain and tenderness in the area of the break.

   (b). Swelling and discoloration in the area of the break.

   (c). Deformity of the area.

   (d). Difficulty moving adjacent joints.

   (e). General symptoms for a compound fracture are the same as a simple fracture except there may be bleeding and bone protrusi.

2. Fractures of the neck, back, and ribs can be very serious if not treated properly. Extreme care must be given a victim with neck, back, or rib injuries. If you suspect neck or back fractures, do not move the victim, unless their life would be in danger otherwise. Fractures of the neck vertebrae should be suspected if the victim has difficulty in feeling or moving either arms or legs.

c. First Aid

1. First aid for simple and compound fractures is:

   (a). Do not attempt to reduce or set a fracture.

   (b). Keep the victim lying down and monitor/ treat for shock if present and call EMS (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

   (c). Maintain an open airway at all times.

   (d). Protect the victim from further injury.

   (e). Do not move the victim unless there is danger of further injury.

   (f). Control bleeding in an open fracture before further measures are performed. If bleeding is profuse, direct pressure should not be applied over the protruding bone. Use pressure points when necessary. (See Rule 1004)

(g). In an open fracture, cover the wound area with a large, sterile bandage to reduce chance of infection.

(h). Splints are devices applied to the arm, leg, or trunk to immobilize the injured part when a fracture is suspected. Splints should not be used if medical help is readily available. The splint, when used, should be long enough to extend past the joints adjacent to the fracture. Hands and feet should be exposed so the first aid responder can determine whether the splint is too tight by checking for adequate circulation. Splints can be held in place by strips of cloth torn from clothing or other items such as handkerchiefs, neckties, triangular bandages, etc. Secure the ties to the splint firmly so there is no movement but be careful not to turn the splint into a tourniquet. Pad the splint for the comfort of the victim.

2. First aid for suspected fractures of the neck and back:

(a). Call EMS 911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator and maintain open airway at all times.

(b). Do not attempt to move or transport a victim with head, neck or back injuries without assistance of a trained medical provider.

(c). Leave the victim lying down and immobilize the neck and back area to avoid any movement. Place rolled blanket, sand, dirt, or gravel in bags or material around the neck, head, and body of the victim to ensure complete immobilization.

3. First aid for fractures of the rib cage.

Fractures of the rib cage can be quite painful. Unnecessary handling of the broken rib could cause a fractured rib to be driven into a lung, causing the lung to collapse. If the victim has difficulty in breathing, gently place him/her in a semi-prone position which should relieve some discomfort. When blood or fluids are draining from the victim's mouth, place the victim on the side to prevent inhalation of the fluids. Place the victim on the injured side to assist with breathing.

4. Fractures are very painful and it is the first aid responder's duty to make the victim as comfortable as possible with minimal movement, protecting and removing the victim from further injury, and getting medical help as soon as possible.

1006. Burns

a. Definition

A burn is an injury to body tissue resulting from contact with heat, hot objects, hot solutions or vapors, (thermal burns) chemicals, radiation, and electricity. This section deals with first aid for thermal, chemical and electrical burns. Most burns involve pain. Symptoms of shock may also be present and if so, require immediate treatment (See Section 1003). Depending on the cause of the burn, there may be other injuries as well which will require immediate activation of Emergency Medical Services (EMS).

b. First Aid

1. Thermal Burns

The objective of the first aid responder attending a thermal burn victim is to: identify and treat for shock (See Rule 1003); determine if medical attention is necessary; prevent infection.

Medical attention is needed if the burn, or the burn victim has any of the following characteristics:

(a). Burn is larger than the size of the person's open hand.

(b). Burn contains blisters.

(c). Burn darken or breaks the skin.

(d). Burn involves the face, hand, foot, genitals, or skin-folds (i.e. flexural areas).

(e). Burn is not completely clean.

(f). Burn causes pain that is not relieved with over the counter pain medication (e.g. acetaminophen).

(g). Burn causes pain that does not improve with one day after the burn was sustained.

(h). Burn victim may have inhaled smoke.

(i). Burn victim has other major injuries resulting from the cause of the fire (e.g. car wreck).

2. Minor Burns — When medical attention is not necessary:

(a). Extinguish the source of the burn if it continues to burn, and it is safe to do so.

(b). Remove any clothing that is smoldering or covered with a hot substance, providing as much modesty for the victim as possible.

(c). Immerse burned area for short periods in cool or cold water until pain subsides.

(d). If immersion in cool or cold water is not possible, apply think cold packs over the burned area.

(e). When the pain has subsided, blot the area dry and bandage with a sterile gauze dressing or Water Jel Burn Dressing lightly in place. If swelling occurs, loosen the bandage or any constricting clothing/jewelry to maintain good circulation. If blisters develop, seek medical attention.

3. Major Burns — When medical attention is needed.

(a). Activate EMS.

(b). Remove or cut away clothing and remove jewelry to reduce problems caused by swelling providing as much modesty for the victim as possible. Do not attempt to remove clothing that sticks to the burn; cut around such clothing.

(c). Cool the burned area with lukewarm to cool water — DO NOT APPLY ICE AND DO NOT APPLY WATER JEL BURN DRESSING.

(d). Only cool until the skin is back to normal temperature. Cooling may intensify the shock reaction if applied over a large, severely burned area.

(e). Apply Water Jel Burn Dressing if available.

(f). Only if Water Jel Burn Dressing is not available; cover the burned area with a thick sterile dressing moistened with saline or cool water.

(g). Cut away clothing and remove jewelry to reduce problems caused by swelling.

(h). Do not attempt to remove clothing that sticks to the burns; cut around such clothing.

(i). Do not apply grease or ointment to any burn.

4. Chemical Burns — Key to effective first aid include:

(a). Remove contaminated clothing, providing as much modesty for the victim possible.

(b). Brush away any dry powders or particles.

(c). Rinse the affected area with large amounts of water — Because chemicals can continue to inflict damage long after first contacting the skin, rinsing should continue for at least 30 minutes.

(d). If eyes were affected by the exposure, they should be thoroughly flushed with water; taking care to flush from the nose outward. Help the victim remove contact lenses if burn includes the eyes, but do not delay irrigation for contact lens removal. Cover eyes with a dry, sterile, protective dressing and bandage in place. Do not use any type of cotton as a dressing for the eyes.

(e). Further treatment of chemical burns is the same as that for thermal burns except that **Water Jel Burn Dressing should not be used with any chemical burn**.

(f). Seek medical attention as soon as possible.

5. Electrical Burns

(a). If possible, separate the victim from the source of the electrical current. The safest way to do so is to shut off the current — for example, by the throwing a circuit breaker or switch or by disconnecting the device from an electrical outlet. You should not touch the person until the current has been shut off, particularly if high-voltage lines are involved.

(b). Once the victim can be safely touched, the first aid responder should check to see if they are breathing and have a pulse the victim person is not breathing and has no pulse, activate EMS and begin Cardiopulmonary Resuscitation (CPR) immediately. (See Section 1015)

(c). Emergency medical assistance should be called for any victim who has lost consciousness, has symptoms of potential heart problems (e.g. chest pain, shortness of breath, thumping in the chest), has other severe injuries, or if there is any doubt about the severity of the injury.

(d). If the possibility of spine injury is present, avoid moving the victim and protect the neck and back from further injury.

1007. Heatstroke

a. Definition

Heatstroke is a response to heat, characterized by extremely high body temperature. This condition is a life-threatening emergency for which first aid is urgently needed.

b. Symptoms

1. There are four primary symptoms:

(a). Hot, dry skin.

(b). Flushed or red face.

(c). Fast, throbbing pulse.

(d). Extremely high body temperature of 106 degrees or higher.

2. Other symptoms are:

(a). Headache.

(b). Dizziness and nausea.

(c). Unconsciousness in severe cases.

c. First Aid

Immediate measures should be taken to reduce the body temperature. Temperature reduction should be done quickly, taking care to prevent chilling.

1. Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

2. Move victim to a cool, shaded area. If they start to shiver or say they are cold, cover the victim to maintain normal body temperature.

3. Keep victim lying down or in a position they find of comfortable.

4. Loosen or remove tight fitting clothes.

5. Apply ice packs or cold packs to the forehead, under the armpits, behind the neck, and knees. Do not immerse victim in ice water. If ice packs or cold packs are not available, dampen the victim with cool or tepid water.
6. Do not give liquids to an unconscious or semiconscious victim. When the temperature goes down, and the victim feels better, liquids can be given in gradual amounts, a sip at a time.

d. Prevention

The following precautions should be taken when working or playing in the sun or extreme heat:

1. Gradually adjust the body to the climate, especially when sunbathing.
   (a) Generously apply a water-resistant sunscreen with a Sun Protection Factor (SPF) of at least 15 that provides broad-spectrum protection from both ultraviolet A (UVA) and ultraviolet B (UVB) rays to all exposed skin. Re-apply every two hours, even on cloudy days, and after swimming or sweating.
   (b) Wear protective clothing, such as a long-sleeved shirt, pants, a wide-brimmed hat and sunglasses, where possible.
   (c) Seek shade when appropriate, remembering that the sun's rays are strongest between 10 a.m. and 4 p.m. If your shadow is shorter than you are, seek shade.
   (d) Use extra caution near water, snow and sand as they reflect the damaging rays of the sun, which can increase your chance of sunburn.
2. Eat lighter meals and drink more fluids even if you are not thirsty and avoid alcoholic beverages.
3. Consult with your health care provider to ensure medications you are on do not interact negatively with sun exposure.

1008. Heat Exhaustion

a. Definition

Heat exhaustion is the result of overexposure to excessive heat over a prolonged period of time. It is a response to heat characterized by fatigue, muscle weakness and collapse.

b. Symptoms

1. The primary symptoms are the same as in shock:
   (a). Pale face.
   (b). Cool, clammy skin.
   (c). Rapid, but weak, pulse, regular or irregular rhythm.
   (d). Profuse perspiration.
2. Other symptoms are:
   (a). A normal or slightly lowered temperature.
   (b). Dizziness and nausea.
   (c). Unconsciousness in severe cases.

c. First Aid

Care for heat exhaustion is similar to first aid for shock.

1. Move the victim, if necessary, to a cool area with shade and circulating air.
2. Keep the victim lying down with the head level with the body, and loosen tight clothing to allow for better circulation and breathing.
3. Maintain normal body temperature. **Do not overheat the victim.**
4. If conscious, give sips of water to replace lost fluids.
5. If recovery is not prompt, seek medical attention.

d. Prevention

1. Gradually adjust the body to the climate.
2. Wear proper clothing when working or playing.
3. Eat lighter meals, drink more fluids, and add extra salt to the diet. Check with your doctor before using more salt since it could complicate some medical problems, like high blood pressure.

1009. Heat Cramps

a. Definition

Heat cramps are an imbalance of salt and water in the body due to improper perspiration.

b. Symptoms

1. Muscle cramping in legs or abdomen due to the salt loss.

c. First Aid

1. Have victim rest. Move victim to a cool, shaded area.
2. Stretch the cramping muscles gently to help relieve the spasm/cramps.
3. Drink water to help balance sodium.
4. If problem persists, seek medical aid.

1010. Sprains

a. Description

In a sprain, the tendons or ligaments that bind bones together at the joint are stretched beyond their limits. In some cases, the ligament, joint capsule, muscles, tendons, and blood vessels may be ruptured, depending on the extent of the injury. The tearing of blood vessels causes blood to escape into the surrounding area and is responsible for the visible bruising. A sprain may be as serious as a simple fracture.

b. Symptoms

1. Swelling can occur rapidly.
2. Pain, especially on motion.

3. Discoloration develops as blood collects in the joint.
4. Tenderness to the touch.

c. First Aid

First aid care is limited to keeping the injured part immobile. To reduce swelling, keep the injured part elevated above the level of the heart and apply ice packs to the injured area for the first 24 to 48 hours. Reduce swelling by applying an ace wrap, sling/splint, or binding the injured part.

d. Dangers

In some cases, a sprain is accompanied by a simple fracture and medical attention should be sought.

1011. Dislocations

a. Description

When a bone is dislocated, it is moved partially or completely out of its normal joint position. A dislocation occurs when the bones are in a position in which muscle support is at a minimum. No joint is immune from dislocation. If the dislocation cuts off blood supply, a major orthopedic emergency can take place.

b. Symptoms

1. Severe pain, especially upon movement of the joint.
2. Deformity of joint area, slight to severe.
3. Rapid swelling.

c. First Aid

Only a physician should attempt to treat the dislocated joint.

1. Seek medical attention immediately.
2. Keep victim lying down or in a semi-reclined position.
3. Apply cold packs to the injured joint to reduce swelling.
4. Immobilize the injured extremity by applying a sling, a splint, or binding to the body.

1012. Head Injuries

a. Definition

Head injuries may be classified according to the structure involved. Skull fractures are injuries to the bone structure, and concussions are injuries to the brain and its covering. The scalp may be cut, or great areas of it may be torn away. Within the skull, either the coverings of the brain and/or the brain itself may be damaged.

b. Symptoms

The easiest symptoms to observe, if there are no overt signs, are the eyes. One or both pupils may be dilated. The right side of the brain controls the left side of the body and vice versa. If both pupils are dilated, there may be a severe head injury present, usually at the base of the skull. Other symptoms include:

1. A period of unconsciousness.
2. Lacerations which may result in profuse bleeding.
3. Bleeding from the nose and ears.
4. Dripping of clear fluid from the nose and ears. This is caused by the rupture of a thin membrane called the dura mater. This symptom denotes a very serious head injury.
5. The face may be pale or flush (red).
6. Headache, dizziness, nausea, vomiting or excessive fatigue may be present.
7. Disturbance of speech, difficulty in breathing and/or coordination, or weakness of or inability move the arms and/or legs.

c. First Aid

It is necessary to protect the head and neck from further movement and injury. Keep head elevated if possible.

1. Call for medical assistance (911 or or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.
2. Do not stop bleeding from nose or ears.
3. Control extensive bleeding from scalp if present. Do not use excessive pressure.
4. Keep victim comfortable lying down. Place a rolled blanket, sand/dirt/gravel in bag or material to support neck and head for immobilization. (See Section 1005)
5. Monitor airway, breathing, and circulation.

d. Dangers

Never minimize the severity of head injuries. Complications may occur some time after the original injury. A person suffering a head injury should be monitored for at least five to six hours after the injury. Any deviation from normal behavior, such as speech difficulties, increased tiredness, double or blurred vision, recurrent dizziness and nausea, lack of coordination, and memory loss, should be checked by a health care professional as soon as possible.

1013. Eye Injuries

a. Definition

Foreign objects are often blown or rubbed into the eyes. These objects may scratch the surface of the eye or become embedded in the eye. Injuries may occur to the eyelids. Contusions can involve tissue around the eye, and in serious cases, the structure of the eye may be torn or ruptured. Penetrating injuries of the eye are extremely serious and can result in blindness.

b. Symptoms

1. Red and irritated eyes.
2. Burning sensation.
3. Pain, which may be quite severe.

4. Excessive tear production.
5. Headache.
6. Blurred, partial, or complete loss of vision

c. First Aid

First aid for eye injuries is minimal due to the sensitivity of the organ. Keep the victim from rubbing the eye. Do not attempt to remove a foreign object from the eye. Keep injured victim calm.

1. Presence of a foreign object:
   (a). Seek medical attention immediately.
   (b). Flush the eye thoroughly with water to remove objects.
   (c). If the object is still not removed, it may be embedded in the eye. Put a raised object, such as a cup, over the injured eye. Apply a clean, sterile dressing over the other eye and bandage both in place. This limits movement of the eye which could cause further damage.
2. Lacerations near the eye:
   (a). Apply direct pressure gently over the wound to control bleeding.
   (b). Apply a sterile dressing and bandage in place.
   (c). Seek medical attention. Further damage from hemorrhage or infection may occur.
3. Contusions around the eye:
   (a). Apply cold packs to reduce swelling.
   (b). Apply a clean or sterile dressing and bandage in place.
4. Penetrating injuries of the eye:
   (a). Seek medical attention immediately. This is an extremely serious injury and blindness could result.
   (b). Do not attempt to remove or wash out the object.
   (c). Apply a raised object such as a plastic cup over the injured eye and a clean or sterile dressing over the other eye to reduce movement.

d. Dangers

All eye injuries can be very serious. After first aid care is applied, the victim should seek medical attention as soon as possible.

1014. Mouth-to-Mouth Resuscitation

a. Introduction

Mouth-to mouth resuscitation is the skill or process of providing ventilation to a victim who shows no sign of breathing, but who does show signs of firculation (pulse). Mouth-to-mouth resuscitation shall ONLY be delivered by those personnel who have received advanced training in the technique. For all other responders, if a non-breathing victim is encountered, they should immediately institute Cardiopulmonary Resuscitation (CPR). (See Section 1015)

b. Symptoms — Respiratory Arrest

1. The victim's color may be abnormal, such as: pale, ashen, bluish in appearance or, in the case of carbon monoxide poisoning, cherry red (this is a rare late sign. This coloration usually develops after death).
2. No rise or fall of the chest cavity.
3. The victim's body muscles may be relaxed or rigid.

c. Mouth-to-Mouth Resuscitation

1. Call 911 immediately.
2. Perform mouth-to-mouth resuscitation as follows:
   (a). Opening the airway: Put one hand under the victim's chin and the other hand on the victim's forehead. Gently pull the chin away from the back of the throat without closing the mouth. When this is done, the jaw and tongue are drawn forward and the air passage is cleared.
   (b). With the heel of your hand resting on the victim's forehead, bring your thumb and forefinger across to pinch the nose. Pinch the nose and breath into the victim's mouth or nose. Pinching the nose will prevent the rescuer's air from escaping.
   (c). After opening the airway and pinching the nose, you are now ready to breathe into the victim's mouth. Remember, you are breathing for two people, so take a deeper breath than normal. Open your mouth wide enough to encircle the victim's mouth. Air is blown into the victim's lungs until the chest expands visibly. Remove your mouth and take another breath of air while you see or feel the victim exhale.
   (d). Each inhalation and exhalation is termed a cycle. The rhythm is 12 cycles per minute. Every five seconds, you should give the victim one breath of air. Count 1001, 1002, 1003, 1004, breathe.
3. If the victim's mouth cannot be opened, use the mouth-to-nose technique.
   (a). Seal the victim's lips with your thumb so no air can escape.
   (b). Take an even deeper breath and blow into the victim's nose.
   (c). After approximately five to ten breaths, the victim's muscles may relax. If so, begin mouth-to-mouth which is the more desirable method of resuscitation.
4. Dangers

(a). If the stomach balloons or expands, air is not being delivered to the lungs. The cause of this is often the speed with which the rescuer's breath was forced into the lungs. Take a full 1 to 2 seconds for each breath. Release the air by applying gentle pressure with the heel of your hand on the stomach during the exhalation stage.

(b). After the victim has recovered, they should be placed on their side in case they become ill and vomit. If they were to remain on their back, they could choke on vomitus matter. Clear vomitus from mouth and maintain open airway.

d. Alternate Method

In rare cases, mouth-to-mouth/mouth-to-nose resuscitation cannot to be performed due to severe bleeding from the mouth, fractures of jaw, etc. Therefore, the back pressure arm-lift or Holger-Nielson Method should be used.

1. A rescuer kneels at the victim's head, placing hands in the middle of the victim's back. The heels of the hands should be placed at an imaginary line between the victim's armpits, with the thumbs touching and the fingers pointing downward. Be careful not to open the hands too widely.
2. Rock forward, keeping the arms straight, exerting pressure on the victim's back. Release the pressure, then grasp the victim's elbows, applying enough lift to feel resistance. Release the elbows and continue this procedure at a rate of 12 times a minute.
3. Periodically, monitor the victim's mouth to see that it is clear of all foreign matter. After recovery, place victim on the side, cover, and treat for shock until medical help arrives.

1015. Cardiopulmonary Resuscitation (CPR)

a. Description

CPR is a combination of mouth-to-mouth resuscitation and chest compression. It is used when a victim is not breathing and they have no detectable heartbeat. The emphasis of CPR is on the application of the A, B, C's:

A — Open and Clear Airway

B — Rescue Breathing

C — Effective Circulation

In an adult, the heart beats between 60 and 100 times a minute and if, for any reason, the heartbeat stops, death occurs. To save a life, you must know beforehand how to treat the victim.

b. Symptoms — If someone has experienced cardiac arrest, the first aid provider will not be able to detect a pulse. If you come upon someone unconscious:

1. First, check to see if the victim is breathing. If they are not, use mouth-to-mouth resuscitation to give the victim 2 breaths.
2. Next, place your second and third fingertips on the carotid artery located near the Adam's Apple in the neck region. Check the pulse on both sides of the Adam's Apple. No pulse means probable cardiac arrest.

   Chances of recovery decrease with every passing minute. Every critical second counts when a life hangs in balance.

c. Cardiopulmonary Resuscitation — Technique for Adult Victim

1. Call 911 immediately.
2. To compress the heart, pressure is applied manually to the breastbone. The rescuer is compressing the heart between the sternum and backbone. The rescuer must move the chest cavity an inch and a half to two inches to be effective. The positioning of the hands on the sternum is very important. First, locate the lower half of the sternum. If you're not quite certain which is the lower half, run the fingers of the hand nearest the victim's feet along the bottom of the rib cage and find where the rib cage meets the breastbone.
3. Once your fingers detect the spot where the breastbone meets the rib cage, place the heel of the hand nearest the victim's head on the breastbone.
4. The heel of your hand should be on the lower half of the sternum, not the soft fleshy area.
5. The second hand is then placed on the top of the first hand. Entwine fingers to keep them off the ribs.
6. With your shoulders directly over the victim's chest, and your hands in the proper position, lock elbows, keeping your arms straight. If you bend your elbows, you will tire more easily.
7. The heart is compressed against the sternum and spine, forcing the blood out. Relaxation of pressure allows the heart to fill again. The victim must be on a firm flat surface. If the victim is on a soft surface such as a bed, the compressions will be ineffective.

   A solo first aid responder will perform CPR by doing both mouth-to-mouth and Cardiopulmonary Resuscitation. Begin by inflating the victim's lungs two times and begin the compressions on the sternum. The rescuer does 30 compressions on the sternum, and then leans down and gives the victim two breaths of air.

   Each rescue breath should be given over 1 second. Each rescue breath should make the chest rise (rescuers should be able to see the chest rise). All rescuers should avoid delivering too many breaths (more than the number recommended) or breaths that are too large or too forceful.

   After four cycles of 30 chest compressions and 2 breaths (this should take about one minute), the

rescuer should recheck the carotid artery to determine if the heart is beating. If the heartbeat has resumed, CPR can be stopped and the victim checked for other problems (such as respiratory arrest). Otherwise continue CPR until medical help arrives or you become exhausted.

d. Dangers and Precautions

1. If breathing or heartbeat stop, the brain, which is the most sensitive tissue of the body, may be seriously damaged or death may occur. CPR must be started within four to six minutes after breathing and heartbeat stop.
2. Do not place your hands flat on the victim's chest. Damage may occur to the ribs and pressure will not be applied where it is needed. Keep fingers off chest.
3. Be sure that your hands are on the lower half of the sternum and not on the fleshy area. Use help of hand only for compressions.

1016. Transfer

a. Definition

Emergency rescue and transfer deal with the movement of victims away from hazardous locations and the use of protective methods to support a victim's body during emergency transfer.

b. Objectives

Emergency rescue and transfer is limited to situations in which professional help is not available or if there is an immediate danger of further injury to the victim. At all other times, the victim should be left where found.

If a person becomes ill or injured to the extent that will require transporting to a medical facility, the first decision to be made by the first aid responder is whether it is necessary for the victim to be relocated. If it is not necessary to immediately extract the victim from a serious hazard, they should not be relocated until such life-threatening problems as respiratory or cardiac arrest are cared for.

It should be recognized that more harm can be done through improper rescue and transfer than through any other measure associated with first aid. In most situations, rescue from confinement should be carried out by ambulance or rescue personnel. Pending their arrival, the first aid provider should gain access to the victim, give emergency care, reassure, and avoid ill-advised or foolhardy attempts at rescue that might jeopardize the safety of the victim as well as that of the first aid provider.

If victims must be pulled or dragged to safety, they should be pulled in the direction of the long axis of the body. They should never be lifted by the head, pulled upward by the belt, or pulled sideways. The victim's entire body should be kept in a straight line and moved as a unit, when possible.

Emergency transfer can be accomplished by one of two methods:

1. Shoulder Drag: Grasp the victim under the arms, bring your arms together so that the victim's head is resting on the inside of your arms. Then pull the victim to safety in a steady motion.
2. Ankle Drag: Grasp the victim by the ankles and pull to safety, avoiding, whenever possible, jerking and jarring motions.

Prior to handling or transporting, observe the victim to determine the extent of injuries. Leave the victim in the position found, if at all possible. If conscious, ask if they will be more comfortable in a different position, providing it does not cause further injury. Remember, improper handling of an injured person may cause additional injury or aggravation of the existing injury.

1017. Sudden Illness

First aid responder's often encounter situations that are not related to injury, but arise from either sudden illness or worsening of a chronic illness. Many persons suffering from heart disease, stroke, epilepsy, or diabetes carry an identification card or bracelet that contains information about the type of illness and the steps to be followed if they are found unconscious. Search the victim for such identification once breathing and heartbeat are restored.

a. Heart Attack

Heart attack often involves a clot in one of the blood vessels that supply the heart. The attack is sometimes called a coronary since there is a loss of blood supply to a portion of the heart muscle. A heart attack may or may not be accompanied by a loss of consciousness. If the attack is severe, the victim may die suddenly. The victim may have a history of heart disease or the attack may come with little or no warning. The pain or pressure that accompanies a heart attack can range from mild to severe. The degree of pain is not a good indication of the seriousness of the attack.

1. Symptoms
   (a). Persistent chest pain or pressure lasting two minutes or longer, usually under the sternum (center of the chest). The pain/pressure may radiate to one or both shoulders, arms, back, neck, jaws, and teeth. Some patients have pain only in the jaw or teeth.
   (b). Gasping or shortness of breath.
   (c). Extreme paleness or bluish discoloration of the lips, skin, and fingernail beds.
   (d). Extreme fatigue.
   (e). Clamminess.
   (f). Nausea and/or vomiting.
   (g). Unconsciousness.
2. First Aid
   (a). Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

(b). Place the victim in a calm and comfortable position. This is usually a sitting position leaning back at a 45 degree angle. This position will allow the victim to breathe easier. Perform CPR if the victim is not breathing and unresponsive. (See Rule 1015)

(c). If alert and able to swallow, offer one aspirin by mouth (to be chewed without water). Check to make sure there are no allergies prior to offering.

(d). If the victim is awake and has prescribed nitroglycerin, help them take it.

(e). Do not give any liquids or food.

(f). Do not transport the victim without medical advice unless there are absolutely no other alternatives.

b. Stroke

A stroke usually involves a spontaneous rupture of a blood vessel in the brain or a formation of a clot that interferes with circulation. In a major stroke, a large blood vessel to the brain is involved.

1. Symptoms of stroke:

(a). Unconsciousness or any subtle/overt changes with mental behavior.

(b). Paralysis or weakness on one side of the body.

(c). Difficulty in breathing, swallowing, or speaking.

(d). Loss of bladder or bowel control.

(e). Pupils may be unequal in size.

(f). Headache — severe or mild.

2. First aid for a major stroke:

(a). Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

(b). Provide moderate covering; treat for shock as needed (See Rule 1003). Reassure victim.

(c). Maintain an open airway.

(d). Perform CPR if needed. (See Rule 1015)

(e). Place the victim on the affected side so that secretions will drain from the mouth.

(f). Do not give any liquids or food.

(g). Maintain victim's dignity.

(h). Remember that the victim can usually hear and understand what you are saying, even if they are having trouble talking to you.

c. Fainting

Fainting is a partial or complete loss of consciousness due to a reduced blood supply to the brain for a short period of time. The victim collapses suddenly, with or without warning. Recovery of consciousness almost always occurs quickly. However, injury may occur from the fall. To prevent any injury from fainting, a person who feels weak or dizzy should lie or be assisted to the ground or bend over with the head at knee level. If a person bends over to put their head at the knee level, make sure there is support so they do not fall off a chair and cause further injury.

1. Symptoms

(a). Extreme paleness.

(b). Cool, clammy skin.

(c). Dizziness and nausea.

(d). Numbness and tingling of the hands and feet.

(e). Possible disturbance of vision.

2. First Aid

(a). Help or encourage the victim to lie down.

(b). Maintain an open airway. Perform Head-tilt chin-lift maneuver. (See Rule 1015)

(c). Loosen any tight clothing and provide adequate ventilation.

(d). If the victim is nauseous, roll the victim as a unit onto their side to prevent inhalation of the vomitus matter if it should occur.

(e). Do not pour water over the victim's face. Wipe the face gently with cool damp cloths and treat for shock.

(f). Do not give any liquids until the victim has completely revived. Consider sips of liquids.

(g). Examine the victim for injuries suffered if they have fallen. Unless recovery is prompt, seek further medical assistance. Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

d. Seizures

If the normal functions of the brain are interrupted by disease, infections, or injuries, the electrical activities of the brain can malfunction. The malfunction can cause seizures by bringing on sudden changes in sensation, behavior, or movement. Seizures are not a disease, but a sign of an underlying disease. Epilepsy is the best known condition that causes seizures. Epilepsy is only one of many conditions that may cause seizures. Some other causes of seizures include low blood sugar, brain tumors, birth defects, high fevers, poisons, trauma, and infections.

1. Symptoms

(a). Rigidity of body muscles, usually lasting from a few seconds to perhaps half a minute, followed by violent jerking movements.

(b). The victim may stop breathing, and bite the tongue (if not breathing, maintain airway by Head-tilt chin-lift maneuver).

(c). The victim may lose bladder and bowel control.

(d). The victim may foam at the mouth or have heavy drooling.

(e). Mild seizures may appear as staring spells or repetitive purposeless behavior.

2. First Aid

(a). Assist to the ground to prevent harm and injury

(b). Do not force anything into the mouth and do not give anything by mouth.

(c). Protect the victim's head by placing something soft under it.

(d). Do not restrain the patient.

(e). Reassure the patient (they may still hear you).

(f). Allow the patient to rest after the seizure is over and provide re-orientation.

(g). Following the seizure, you may turn the victim on their side to allow fluids to drain from the mouth.

(h). Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

1018. Snake Bites

a. Definition

The rattlesnake is the only poisonous snake found in our service territory. It is important to be able to identify the snake if a bite occurs. Victims have been known to go to great extremes for treatment when the snake was not even poisonous.

b. Symptoms

All reactions from snakebites are aggravated by acute fear and anxiety. Rattlesnake bites may show some of the following symptoms:

1. Extreme pain at bite location (with the exception of the Mojave Rattlesnake).
2. One or more puncture wounds from the fangs.
3. Rapid swelling.
4. Discoloration of the skin.
5. General weakness, numbness or tingling.
6. Rapid pulse and shortness of breath.
7. Nausea and vomiting.
8. Blurred vision.
9. Shock.

c. First Aid

Immediate care is absolutely necessary.

Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately, to secure transportation to the nearest hospital as soon as possible.

1. Keep the victim lying down and immobilized, if possible. Remove any constricting jewelry such as rings, bracelets to reduce complications that could arise if rapid swelling occurs.
2. Do not apply ice or any other cooling agent to the bite.
3. Wash the bite with soap and water, if available.
4. Use a pen to mark the time and border of advancing edema (swelling) every 15 minutes to help medical personnel estimate the severity of the bite.
5. Do not apply ice or any other cooling agent to the bite.
6. Do not give any liquids or food.
7. Treat the victim for shock. If possible, keep the bitten area lower than the level of the heart.
8. Secure medical treatment and transportation to the nearest hospital as soon as possible. Comfort the victim until the arrival of trained medical personnel. If you must transport the victim, be sure the victim is transported with the bitten area immobilized. Keep the victim in a comfortable position, lying on his/her back if possible.
10. Snakebite kits are no longer recommended by leading authorities on snake bite care and should not be used.
11. Attempt to identify or obtain specific characteristic description of the snake, if you can do so without endangering yourself or the victim.

1019. Insect Bites

a. Definition

Stings from scorpions, ants, bees, wasps, hornets, and yellow jackets may cause severe pain and localized swelling. A more severe reaction is almost always due to acute allergic reaction or multiple stings. Some types of bees are much more aggressive and are likely to give multiple stings, but the first aid is the same. Bites from insects such as fleas, mosquitoes, lice, gnats, chiggers, etc., produce local pain and irritation and may transmit disease to the victim. Some ticks also carry Lyme disease and adhere tenaciously to the skin. Bites of the black widow spider and the brown recluse (or violin) spider can be very painful and serious.

b. Symptoms

1. Minor Bites

(a). Localized pain.

(b). Irritation and swelling.

(c). Nausea, vomiting, and other symptoms of shock if there is an allergic reaction.

2. Black Widow Spider Bites

(a). Pain and swelling at the site of the bite.

(b). The pain spreads throughout the body.

(c). Profuse perspiration.

(d). Nausea and abdominal cramps.

(e). Difficulty in breathing and speaking.

(f). Possible development of convulsions.

(g). Ringing in the ears and headache.

(h). Pupils are dilated and reflexes are over-active.

3. Brown Recluse (Violin) Spider Bites

(a). Mild, transitory stinging at the time of the bite. Very little early pain, only after two to eight hours. The pain varies from mild to severe.

(b). After several days, an open ulcer may form at the site of the bite that progressively enlarges.

(c). Development of chills, fever, joint pains, nausea, and vomiting.

(d). Possible development of generalized rash within from 24 to 48 hours.

4. Scorpion Stings

(a). Excruciating pain where stung with little inflammation or swelling.

(b). Acute restlessness and drooling of saliva.

(c). Abdominal muscles become rigid and contraction of arms and legs may occur.

(d). Temperature may reach 103 to 104 degrees.

(e). Skin may gradually turn blue and respiration may become difficult.

c. First Aid

1. Minor Bites

(a). Immediate application of antibiotic ointment after checking to ensure the victim is not allergic to the product.

(b). Cold compresses.

(c). If symptoms increase, secure medical assistance.

2. Major Bites (Spiders, Scorpions, etc.) and Severe Reaction to Minor Bites

(a). Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

(b). Provide Cardiopulmonary Resuscitation (CPR) if needed. (See Rule 1015)

(c). Treat and anticipate for shock symptoms, if necessary.

(d). Keep affected part below the level of the victim's heart.

(e). Apply an antibiotic ointment to the bite area after checking to ensure the victim is not allergic to the product.

(f). Apply cold packs to the bite area.

(g). In case of a bee sting, remove the stinger and venom sac, being careful not to break or squeeze the sac. One of the best ways to remove the stinger is to scrape it off using some plastic or stiff paper. Watch where the stinger goes, as it still has the poison in it and can affect others.

1020. Animal Bites

a. Definition

Injuries produced by any animal, wild or domestic, may result in an open wound. Dog and cat bites are common. A dog bite may cause more extensive tissue damage than a cat bite, although the cat bite may be more dangerous because of the wider variety of bacteria that is usually present in the mouth of a cat. Some wild animals, especially bats, raccoons and rats transmit rabies. Rabies can be transmitted when a rabid animal licks an open wound on a human or another animal. Tetanus is an added danger to animal bites. There is a great risk of infection from an animal bite. Human bites can also cause serious infections.

b. First Aid

1. A bite on the face or neck requires immediate medical attention. Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.

2. Thoroughly wash the wound with soap and water. Apply antibiotic ointment after checking to ensure the victim is not allergic to the product and a dressing.

3. Obtain a description of the animal and the geographical location where the bite occurred. Keep in contact with any suspected rabid animal so that it can be kept under observation to determine whether or not it develops the final stage of rabies. Do not kill the animal unless absolutely necessary.

4. Report the incident to local health authorities and follow their advice.

5. When animal bites break the skin, the victim must be taken to a physician.

1021. Poison Oak

a. Definition

Western poison oak usually grows in shrub and sometimes vine form. It is found in California and parts of adjacent states. The most distinctive features of poison oak are the leaves, which are composed of three leaflets each. The plants also have greenish-white flowers and berries that grow in clusters. Contact with

the oil on the plant causes the allergic reaction associated with poison oak.

b. Symptoms

1. Itching with blister formation.
2. Redness.
3. A rash begins within a few hours after exposure. It may be delayed as long as 10 days.

c. First Aid

1. Remove contaminated clothing. Wash all exposed areas thoroughly with soap and water.
2. Apply medication as directed by a health professional to the affected area.
3. Seek medical advice if a severe rash occurs.
4. Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately, for any severe allergic reaction involving the respiratory system, such as severe shortness of breath.

d. Prevention

1. Learn to identify the poisonous plants in locations where you live and work.
2. Avoid contact with noxious plants.
3. Stay away from plants that are being burned — the smoke may contain active substance.

1022. Aerial/Poletop Rescue

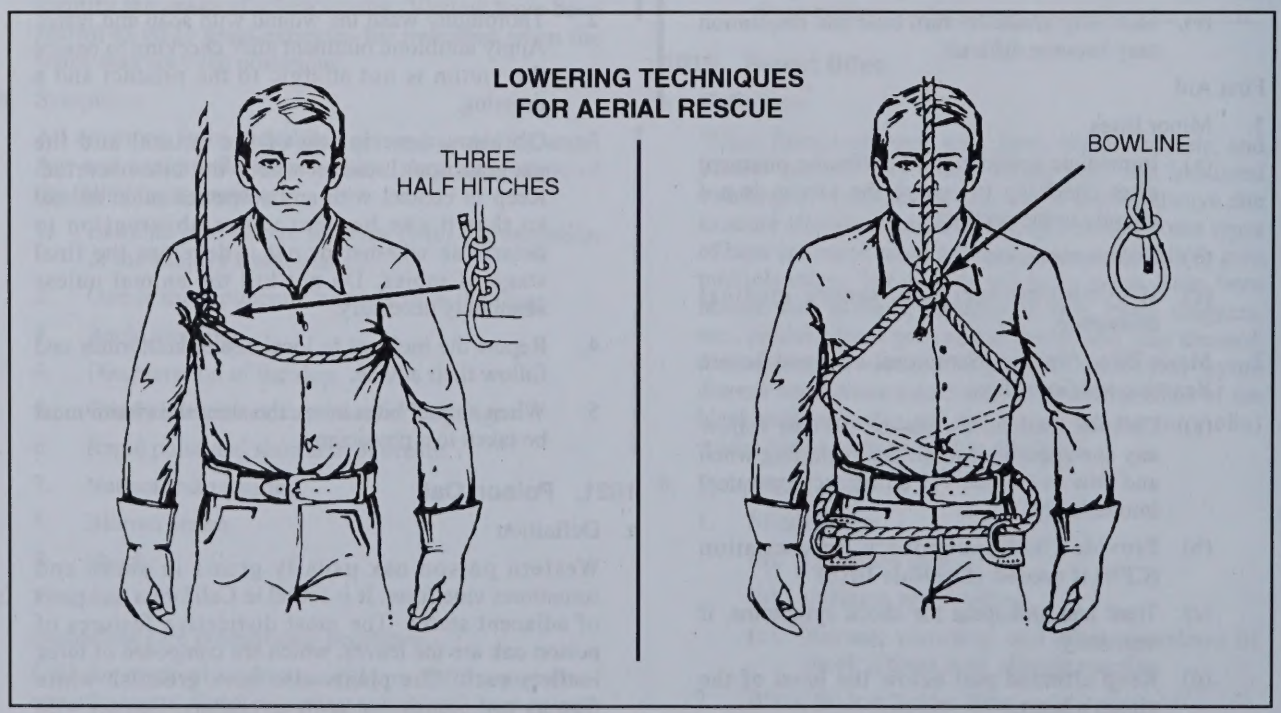
a. Description

Aerial/Poletop rescue is used whenever a person is incapacitated while in an elevated position. The purpose in rescuing a person is to clear the victim from any imminent danger, administer first aid, and lower the victim to the ground. The lowering techniques are divided into two separate categories: the lineman's body belt method and the fast rope tie.

1. The Lineman's Body Belt method can be used when lowering a victim from an elevated position.
2. The Fast Rope Tie method should be used only in the event of a cardiac arrest when it becomes necessary to lower the victim to the ground immediately so that CPR can be given while the victim is in a horizontal position; a position that is infeasible to attain while on a pole or structure.
3. Rope with a safe work load rating equal to approved 1/2 inch hand line material shall be used when lowering a person from a pole or elevated position.

b. Aerial/Poletop Rescue

1. If the victim has no pulse, immediately lower the victim to the ground and call 911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator.
2. After the victim has been lowered to the ground, institute CPR (See Section 1015) and continue until the arrival of an ambulance or other rescue personnel.



1023. Frostbite

a. Definition

Frostbite is the most common injury resulting from exposure to cold elements. It occurs when tissues of the nose, cheeks, ears, fingers, and toes freeze. The effects are more severe if the injured area is thawed and then re-frozen Frostbite can leave permanent damage to tissues. A person with frostbite may also be subject to hypothermia. (See Rule 1025)

b. Symptoms

1. Just before frostbite occurs, the affected skin may be slightly flushed. Frostnip is the first stage, fingertips or exposed patches of skin will appear shiny.
2. As frostbite develops the skin changes to white or grayish-yellow in appearance.
3. Pain is sometimes felt early but subsides later as nerve endings become numb (often there is no pain).
4. Blisters may appear later.
5. The affected area feels intensely cold and numb.
6. The victim frequently is not aware of frostbite until someone tells him/her or he/she observes the pale, glossy skin.

c. First Aid

1. The objectives of first aid are to protect the frozen area from further injury, to warm the affected area rapidly, and to maintain respiration. Check for hypothermia and treat those symptoms first. (See Rule 1025)
2. Procedure
   (a). Bring the victim indoors or to a warmer place and shelter from the cold.
   (b). Call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.
   (c). Provide extra clothing and blankets and remove wet or damp clothing.
   (d). Give the victim a warm drink if the victim can tolerate it (Do not give caffeinated beverages).
   (e). Cover or loosely bandage the frozen areas.

   CAUTION: Rewarming of frozen body parts should be done by medical professionals to prevent further trauma to the victim. If emergency medical assistance is not available, rewarm the frozen part quickly by immersing it in water that is warm (102°–105°F) but not hot, when tested.

   NOTE: If the affected part has been thawed and refrozen, it should be warmed at room temperature (70°–74°F).
   (a). If warm water is not available, wrap the affected area gently in a sheet and warm blankets.
   (b). DO NOT rub or massage the area; rubbing may cause gangrene.
   (c). DO NOT apply heat lamps or hot water bottles or allow the victim to bring the affected area near a hot stove.
   (d). DO NOT break the blisters.
   (e). In case of minor exposure only, once the affected area is re-warmed, have the victim exercise it.
   (f). Since severe swelling develops very rapidly after thawing, discontinue warming as soon as the affected area becomes flushed.
   (g). If fingers or toes are involved, place dry, sterile gauze between them to keep them separated.
   (h). Keep injured areas elevated.
   (i). Obtain medical assistance as soon as possible.

d. Prevention

1. Prevention involves limiting, if not avoiding, the duration of exposure to cold.
   (a). Wear protective clothing (Layers are best) and cover the head, face, ears, and extremities.
   (b). Recognize early symptoms of the onset of frostbite.
   (c). Remove yourself from such exposure.
   (d). Avoid smoking while working or playing in cold temperatures.

1024. Underground Structure Rescue Procedure

In the event of an incapacitating injury or illness to an employee working in an underground structure, the following procedure shall be followed:

a. Communicate the situation and request assistance as outlined in Rule P–14a.

b. Call 911 or follow any site-specific instructions regarding when and how to call the 911 emergency operators to secure trained medical responders as quickly as possible.

c. Insure that the structure is safe to enter, as outlined in Rule 143.

d. After meeting the requirements of safe entry, enter the structure and administer necessary first aid.

e. Wait for the arrival of qualified assistance and follow their direction for the rescue and transportation of the victim. (See Rule 1016)

1025. Hypothermia

a. Definition

Lower than normal body temperature, due to a cool and wet, or cold environment. Water, wet clothing, and wind accelerate heat loss. This can be a life-threatening condition.

b. Symptoms

1. Shivering.
2. Weakness and loss of coordination.
3. Difficulty in performing tasks.
4. Makes poor decisions.
5. Loss of consciousness.
6. Breathing and heartbeat slow or absent.

c. First Aid

1. Monitor breathing and circulation.
2. Prevent further heat loss, shelter patient from wind and water.
3. Replace wet clothing with dry. Cover patient's head.
4. If mild signs/symptoms, you may add heat to the neck, armpits, and groin. If moderate to severe symptoms, prevent further heat loss and call for medical assistance (911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator) immediately.
5. Do not give tobacco or caffeine to the victim.
6. Take care not to burn patient if you add heat to the body.

CAUTION: Patient's judgment may be impaired. You will need to make decisions for him/her. Also, there may be injuries. If patient is responsive, perform an injury assessment to identify injuries. If patient is unconscious, monitor breathing and heartbeat and control bleeding.

1026. Poisoning

a. Introduction

A poison is any substance that can harm the body. In the United States there are more than a million cases of poisoning reported each year. While some are suicide or even murder attempts, most are caused by accidental exposure. These accidents usually involve common substances such as cosmetics, medications, petroleum products, and pesticides. Surprisingly most chemicals in everyday use contain substances that are poisonous if misused. While we usually think of chemicals around us when poisoning is mentioned, there are other sources as well. Mushrooms and other common plants can be poisonous if eaten. Bacterial contaminants in food may produce deadly diseases such as botulism. Some poisons may have a much greater effect on one person than another. Some may be far more serious to children or the elderly. Poisons may enter the body by injection, absorption, inhalation, or ingestion.

b. Injected poisons

1. Symptoms
   (a). Noticeable stings or bites on the skin
   (b). Puncture marks
   (c). Blotchy skin
   (d). Pain or itching at the site
   (e). Swelling or blistering at the site
   (f). Burning sensation at the site followed by pain spreading throughout the body.
2. First Aid
   (a). Remove jewelry from affected limb to reduce problems caused by swelling.
   (b). Keep the affected limb lower than the heart to limit swelling.
   (c). Call 911 or local emergency assistance number.

c. Absorbed poisons

1. Symptoms
   (a). Skin Reactions (burns or rashes)
   (b). Itching
   (c). Irritation of the eyes
   (d). Headache
   (e). Increased skin temperature
   (f). Abnormal pulse or respiration rates
   (g). Allergic reactions
2. First Aid
   (a). Remove the person from the source of the poison being careful not to get it on you also
   (b). Remove all remaining poison from the skin
   (c). Remove all contaminated clothing
   (d). Call 911 or local emergency assistance number.

d. Inhaled Poisons

1. Symptoms
   (a). Dizziness
   (b). Shortness of breath
   (c). Coughing
   (d). Irritated or burning eyes
   (e). Burning sensations in the mouth, nose, throat, or chest
   (f). Severe headache
   (g). Nausea and vomiting
   (h). Changes in skin color (usually bluish)
   (i). Excessive mucus or tearing
   (j). Blood tinged saliva
2. First Aid

(a). Remove person from the source of the poison

(b). Maintain an open airway

(c). Call 911 or local emergency assistance number.

(d). Give artificial respiration if the victim is not breathing, use a C.P.R. mask if available to keep from contacting the poison yourself

e. Ingested Poisons

1. Symptoms

(a). Burns or stains around the mouth

(b). Unusual breath odors or body odors

(c). Abnormal breathing or heart rates

(d). Enlarged or constricted pupils

(e). Excessive sweating

(f). Excessive drooling or foaming at the mouth

(g). Pain in the mouth or throat, or problems in swallowing

(h). Abdominal pain or tenderness

(i). Nausea, retching, or vomiting

(j). Seizures

(k). Altered state of conscious

2. First Aid

If the person is unconscious

(a). Call 911 or local emergency assistance number.

(b). Do not give anything by mouth if the person is unconscious

(c). Look around the area and try to figure out what poison the person ingested. Look for open containers, spilled contents, or residue on the face and hands.

(d). Maintain an open airway

(e). If the person stops breathing give rescue breathing (use a C.P.R. mask if one is available)

(f). Position the person on their side so that if they do vomit the vomitus does not enter the lungs.

3. If the person is conscious

(a). Try to figure out what poison the person ingested. Look for open containers, spilled contents, or residue on the face and hands. Ask the person what they took and how much they ingested.

(b). Call the local poison control center or activate emergency medical services system (call 911 or local emergency assistance number). Follow instructions provided by the poison control center.

(c). Do not give anything by mouth if the person is having seizures

(d). Have the person sit in a comfortable position and monitor them closely.

1027. Obstructed Airway

a. Introduction

Obstructed airways are the cause of death in thousands of people each year. You may witness someone choking on food, or find someone who is unconscious and after determining that they were not breathing, find you can't inflate their lungs with rescue breathe. In order to restore spontaneous breathing, you need to clear the victim's airway from the obstruction.

b. Conscious Victims

If the victim is coughing you should just encourage them to cough up the obstruction. Watch the victim closely while they try to clear their airway. There may be high pitched noises, very weak coughing, or they may have extreme difficulty breathing. Ask the person if they can still breathe. If they cannot breathe tell them that you can help.

1. Call 911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator.

2. Stand behind the victim and wrap your arms around their abdomen.

3. Make a fist and place the thumb against the victim's abdomen, slightly over the navel.

4. Place the second hand on top of the first and press firmly into the abdomen with a quick upward thrust. Repeat the thrusts until the object is expelled or the victim becomes unconscious.

5. Assist the victim to the ground.

NOTE: Once a victim becomes unconscious shout for help and start CPR. (See Rule 1015)

c. Unconscious Victims

If you find someone who was choking and became unconscious and not breathing, provide rescue breath. If unsuccessful, re-tilt the head and try again.

1. If you are alone with the victim, start the steps of CPR. Otherwise, send someone to Call 911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator.

2. Every time you open the airway to give breaths, open the victim's mouth wide and look for the object. If you see an object, remove it with your fingers. If you do not see an object, keep giving sets of 30 compressions and two breaths until the victim starts to move, or trained help takes over.

d. Obese or pregnant victims.

If you have an extremely obese victim, or the victim is pregnant, we need to modify the procedure used. With a pregnant victim, we do not want to endanger the baby

by squeezing in the abdominal area. With an obese victim you can not reach around to squeeze in that area.

1. Conscious Victims.
   (a). Call 911 or follow any site-specific instructions regarding when and how to call the 911 emergency operator.
   (b). Stand behind the victim and wrap your arms around their chest.
   (c). Make a fist and place the thumb side against the victim's chest with the fist on the lower half of the breastbone.
   (d). Place the second hand on top of the first and squeeze firmly with a quick thrust. Repeat the thrusts until the object is expelled or the victim becomes unconscious.
2. Unconscious Victims
   (a). Call 911.
   (b). Position the victim on their back.
   (c). Kneel beside the victim.
   (d). Place your hand on the chest on the lower half of the breastbone in the same manner used in Heart Compression. (See Rule 1015)
   (e). After you have done five thrusts, move to the victim's head. Open the victim's mouth and look for the obstruction.
   (f). Open the victim's mouth by grasping the tongue and lower jaw between your thumb and index finger. Lift the lower jaw. Make a fingersweep across the back of the victim's throat with a hooking action to try to remove the obstruction.
   (g). Attempt to give a breath. If the breaths will not go in, repeat the sequence.

DEFINITIONS

Accessible Location

A location which can be safely reached by an employee standing on a floor, platform, runway, or other permanent working area.

Adequate Measures

All necessary steps or procedures required to perform the job safely.

Adequate Ventilation

Ventilation which, under normal operating conditions, is sufficient to keep the concentration of a hazardous gas, vapor, mist, fume, or dust below the amount which will produce harmful effects, or below 20% of the lower explosive limit, whichever is lower, and the oxygen concentration above 19.5% by volume.

Aerial Lift

A mechanical device used to raise employees to an elevated position.

Affected Employee

For the purpose of Rule 106 (Lockout/Tagout), an employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting-up or adjusting operations are being performed under lockout or tagout, or whose job requires the employee to work in an area in which such activities are being performed under lockout or tagout.

Approved

Referring to products, materials, devices, methods, systems, or installations that have been approved, listed, labeled, or certified as conforming to corporate or applicable governmental or other nationally recognized standards.

Approved Containers

A container designed for the specific material involved.

Approved Testing Device

A device used to confirm the status or condition of electrical conductors, apparatus, or equipment to be worked on.

Attached Grounds

This refers to grounded conductors permanently attached to or installed on the surface of wood poles. This includes grounded guy wires, telecommunication and aerial messengers, shy lines and conductors used for the purpose of grounding lightning arresters, potheads, primary and secondary neutrals, apparatus cases or frames, and other equipment.

Attachment Device

A device such as a seal, or cable tie, which is non reusable, attachable by hand, self locking, non releasable with a minimum unlocking or breaking strength of no less than 50 pounds.

Authorized Employee or Person

For the purpose of Rule 106 (Lockout/Tagout), a qualified person who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on that machine or equipment.

Authorized Person

A qualified employee designated to perform specific duties under the conditions existing.

Authorized Representative

An employee that has been designated, by reason of training and experience to represent SCE.

Automatic

A state in which equipment will operate when required without manual aid.

Automatic Circuit Recloser

A self-controlled device for automatically interrupting and reclosing an alternating current circuit, with a predetermined sequence of opening and reclosing followed by resetting, hold closed, or lockout operation.

Backfeed

A source of supply from the load side of the electrical system to a de-energized section of line, apparatus, or equipment.

Balaclava

A close-fitting, knitted cap that covers the head, neck, and face.

Barricade

A physical obstruction such as tapes, screens, or cones, etc., intended to warn and limit access to a hazardous area.

Barrier

A physical obstruction which by design, is intended to prevent accidental contact with exposed energized lines or equipment, or other hazards.

Belt (body)

A simple or compound strap with means for securing it about the waist and for securing a lanyard to it.

Belt (lineman's)

A leather or web (cotton or nylon) belt designed specifically for employees working on poles or structures. It consists of a waist belt, with a front buckle, and two D ringers for attaching a safety strap.

Block

To make automatic equipment inoperative, nonautomatic, or solid.

Bonding

The joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to conduct any current likely to be imposed.

Bracket Equal Potential Grounding

This refers to grounding method where the shorting and grounding of de-energized conductors is performed with sets of personal grounds located on each side of the work area, between the work area and all electrical sources. A pole band is used on the pole where the work is to be performed and is located below the standing position of the lineman. The band is connected by jumpers to the conductors worked upon. The pole band is also bonded to any attached grounds that may be in the workspace. This creates an equal potential work zone.

Bracket Grounding

This refers to a grounding method where the shorting and grounding of de-energized conductors is performed with sets of personal grounds located on each side of the work area, between the work area and all electrical sources. These grounds may be located several spans away if necessary.

BURD Enclosure

Precast transformer enclosure made of either concrete or fiberglass. This enclosure typically houses single phase Buried Underground Residential Distribution transformers or switches (single or three phase). For further explanations, refer to the Distribution UG Construction Standards manual.

CCR

California Code of Regulations

Clearance

The formal authorization, officially issued to a qualified person, at that person's request, to work on an electric line or some piece of operating equipment which is inherently too hazardous to work on while in service, and which has been de-activated or de-energized, in a prescribed manner and placed in a safe condition to be worked on (see Rule 706).

Clearing Trouble

Temporary work that requires isolating a damaged section of electrical lines or equipment from the remainder of the circuit, so as to eliminate any hazard.

Combustible Liquid

A liquid having a flash point at or above 100°F. (37.8°C).

Conductive Object

A wire, cable, or other conducting material capable of carrying current.

CST Enclosure

Precast Surface Operable Parkway Enclosure that commonly houses underground distribution transformers, switches, and cables. (CST was an acronym for Customer Subsurface Transformer). For further explanations, refer to the Distribution UG Construction Standards manual.

Cutout

An assembly of a fuse support with either a fuseholder, fuse carrier, or disconnecting blade. The fuse holder or fuse carrier may include a conducting element (fuse link), or may act as a disconnecting blade by the inclusion of a non-fusible member.

Dead-Front

So designed, constructed, and installed that no energized parts are normally exposed on the front.

Defective

Any characteristic or condition which tends to weaken or reduce the electrical/mechanical strength or safety of a tool, machine, object, or structure of which it is a part.

Distribution Tap Line

A line normally energized above 600 volts having but one source of supply which has been disconnected from this source at a field location. Not included in the above is a line which has been disconnected from its single source of supply at a substation or generating station.

Electric Line Truck

A truck used to transport workers, tools, and material, and to serve as a traveling workshop for electric power line construction and maintenance work. It is sometimes equipped with a boom and auxiliary equipment for setting poles, digging holes, and elevating material or workers.

Emergency

An unexpected situation or occurrence that may result in serious personal injury or property damage.

Employee in Charge

Any employee who is responsible for work procedures and accident prevention.

Enclosed

Surrounded by a fence, wall, case, or housing which will prevent employees from accidentally contacting exposed electrical wiring, equipment, or energized parts.

Enclosed Facility

Any company facility that is or can be closed to the outside is considered an "enclosed" facility. Examples include administrative offices, private offices, meeting rooms, breakrooms, elevators, restrooms, lunchrooms, cafeterias, stairways, hallways, control rooms, locker rooms, showers, storage rooms, machine shops, electric shops, computer rooms, warehouse vaults, and similar facilities.

Energized Conductors/Lines or Equipment

Conductors or equipment which are connected to an energized electrical source.

Engulfment

The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry

The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Equal Potential Grounding

This refers to a grounding method where the shorting and grounding of de-energized conductors is accomplished on the same structure where the work is to be performed. A pole band is used below the standing position of the lineman and is connected to the personal shorts and grounds. The pole band is also bonded to any attached grounds in the workspace. This procedure creates an equal potential work zone.

Equipment (electrical)

A general term which includes fittings, devices, appliances, fixtures, apparatus, and the like, used as part of, or in connection with, an electrical power transmission and distribution system, or a communication system.

Exposed (as applied to energized parts)

Energized parts that can inadvertently be touched or approached nearer than a safe distance by employees. Parts not suitably guarded, isolated, or insulated.

Eye Protection

Eye protection devices are intended to shield the wearer's eyes from a variety of hazards. These devices include spectacles, face shields, and goggles. Spectacles are commonly used to provide primary protection from impact and optical radiation. Face shields are generally intended to shield the wearer's face, or portions thereof, in addition to the eyes, from certain hazards. Face shields are secondary protectors and shall be used only with primary protectors. Goggles are primary protective devices intended to fit the face immediately surrounding the eyes in order to shield the eyes from a variety of hazards. Goggles commonly are available in two styles: eyecup, to cover the eye sockets completely; and cover, which may be worn over spectacles.

Face Shields

Protective devices generally intended to shield the wearer's face, or portions thereof, in addition to the eyes, from certain hazards. Face shields are secondary protectors and shall be used only with primary protectors (spectacles or goggles).

Ferroresonance

An electrical condition which can occur when the capacitive reactance of the conductors is approximately equal to the inductive reactance of the transformer.

First Aid

The recognition of, and prompt care for, injury or sudden illness prior to the availability of medical care by licensed health care personnel.

Flagger

An employee who has been properly instructed in the fundamentals of flagging traffic and the use of approved flagging equipment.

Flammable Liquid

A liquid having a flash point below 100°F (37.8°C), i.e., gasoline.

Free Climbing

For the purpose of Rule 212 (Safety Straps and Lanyards), an employee ascending or descending while on a wood pole without the use or aid of a safety strap(s).

Ground

A conducting connection between an electrical circuit or equipment and earth, or to some conducting body which serves in place of the earth.

Grounded Effectively

Permanently connected to earth through a ground connection of sufficiently low resistance and having sufficient capacity that ground fault current which may occur cannot build up to voltages dangerous to personnel.

Grounding Conductor, Equipment

The conductor used to connect noncurrent-carrying metal parts of equipment, raceways and other enclosures to the system grounded conductor at the service and/or the grounding electrode conductor or at the source of a separately derived system.

Grounding Medium

Approved means in the proper order of priority by which something may be used for grounding.

Guarded

Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers or casings, barriers, barricades, rails or screens, mats, or platforms intended to prevent or impede the approach of persons or objects to a point of danger.

Hazardous Substance

One which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.

High Voltage

A sustained voltage of more than 600 volts, phase to phase.

Insulated

Separated from other conductive surfaces by a dielectric substance (including air space) offering a high resistance to the passage of current.

Insulated Aerial Device

An approved insulated mechanical device used to raise employees to an elevated position.

Insulated Tools

An approved tool designed with an insulating value great enough to protect the employee from exposed energized conductors or equipment.

Kill Switch

Remote mechanism used to stop the operation of a piece of equipment.

Lanyard

An approved flexible line used to secure the wearer of a safety belt or harness, to a drop line, lifeline, or fixed anchorage.

Lifeline

A horizontal line between two fixed anchorages, independent of the work surface, to which the lanyard is secured, either by tying off or by means of a suitable sliding connection.

Line Clearance Tree Trimming Operations

Operations which include the trimming, repairing, chemical treatment, or removal of trees, brush, and miscellaneous vegetation, performed in the vicinity of exposed energized overhead conductors and equipment.

Live Line Tools

Approved tools which are especially designed for work on exposed energized high-voltage lines and equipment.

Local

When a selector switch of a Remote Controlled Switch (RCS) is in the "local" position, the remote radio command operation is disabled.

Machine

The driven unit as distinguished from the driving unit which is defined as a prime mover.

Maximum Rated Load

The total of all loads including the working load, the weight of the employee, and such other loads that may be reasonably anticipated.

Neutral Conductor

A conductor which carries only the unbalanced current from other related conductors of the same circuit.

Nominal Voltage

The actual voltage at which a circuit operates. Can vary from the nominal within a range that permits satisfactory operation of equipment.

Nonautomatic

A state in which equipment which normally operates without manual intervention has been made temporarily nonresponsive. Make solid.

NPCS

Non Permit Required Confined Space.

Obstructions

For the purpose of Rule 212 (Safety Straps and Lanyards), when obstructions make it impracticable to utilize the safety strap(s) around the wood pole.

Oxygen Deficient Atmosphere

An atmosphere containing oxygen at a concentration of less than 19.5% by volume.

Permission

The authorization issued to qualified persons, at their request, to work on a piece of equipment, only when the equipment cannot be de-activated.

Personal Grounds

Portable, flexible copper conductors with clamps which are of suitable design and configuration for the temporary shorting, shunting and grounding of de-energized line and apparatus on which work is to be performed

Personal Protective Equipment

Approved equipment designed to eliminate, preclude, or mitigate personal injury.

"Pin On" Platform

A removable work platform which attaches to an aerial lift.

Platform

An elevated working area or surface used for supporting personnel, materials, and equipment.

Powered Industrial Truck

A mobile power-driven truck used for hauling, pushing, lifting, or tiering materials where normal work is normally confined within the boundaries of a place of employment. As used in this definition, industrial trucks include unmanned automated or semi-automated transport vehicles which utilize wheels and run on guide rails or narrow gauge rail tracks and can be operated by either remote control (i.e. a hand held pendant) or radio communication.

Practicable

Capable of being accomplished by reasonably available and workable means.

PRCS

Permit Required Confined Space.

Prime Mover

An engine or motor whose main function is to drive or operate other mechanical equipment.

Properly Trained Personnel

An employee who has demonstrated that he/she knows the correct methods and procedures required to safely perform a specific task.

Protective Equipment

All approved safety equipment used to protect employees from a known hazard.

Proximity

A specific distance where an employee may be accidentally or inadvertently exposed to a hazard.

Qualified Checker

A person who is thoroughly trained and is familiar with all specific hazards of the job, qualified by Edison Company management.

Qualified Electrical Worker

A qualified employee who by reason of a minimum of two years training and experience with exposed high-voltage circuits, and equipment, and who has demonstrated by performance familiarity with the work to be performed and the hazards involved.

Qualified Line Clearance Tree Trimmer

An employee who has completed a minimum of 18 months related training and on-the-job experience and is familiar with the special techniques and hazards involved in line clearance tree trimming operations.

Qualified Line Clearance Tree Trimmer Trainee

Any employee regularly assigned to a line clearance tree trimming crew and undergoing on-the-job training who, in the course of such training, has demonstrated the ability to perform the assigned duties safely at that level of training.

Qualified Person/Employee

An employee who by reason of experience or instruction is familiar with the operation to be performed and the hazards involved.

Reasonable

What an employee, exercising prudence and good judgment, would do under similar circumstances.

ROPS

Roll-Over Protective Structure.

Safety Factor

Ratio of the ultimate breaking strength of a member or piece of material or equipment to the actual working stress or safe load when in use.

Safety Line

A vertical line from a fixed anchorage, independent of the work surface, to which the lanyard is affixed.

Safety Strap

A web strap designed specifically for use in conjunction with a lineman's body belt to secure an employee to a pole or structure in a manner that permits work with both hands.

Shall

Mandatory.

Shoring System

A temporary structure for the support of earth surfaces formed as a result of excavation work.

Should

Recommended.

Solid

Inoperable; nonautomatic.

Sources of Supply

Electrical lines and equipment capable of energizing, de-energized lines or equipment. This would include, open switches, open taps, open fuses, potheads (made up), induction, energized high-voltage lines crossing over a de-energized line, unprotected energized lines which cross under a de-energized line, and backfeed.

Spiking

The intentional short circuiting, with approved devices, of a normally energized high-voltage conductor to prove it - de-energized.

Suitable

Capable of safely performing the particular function specified.

Suitable Clothing

Appropriate for the job being done to reduce or eliminate any hazards.

Tag

A system or method of identifying circuits, systems, or equipment for the purpose of alerting employees that the circuit, system, or equipment is being worked on.

Thermal Inspection

To utilize an approved heat-sensing instrument to measure the temperature of conductors, apparatus, or equipment.

Third Party

Any non-employees.

Towering

Utilization of an aerial device specifically designed to be a mobile towering unit for the purposes of stringing strand and cables along utility pole lines. This work process allows a person to be driven along a pole line while aloft in the platform.

Underground Structure

Any structure installed below grade used to house electrical cables or equipment.

Wet Location

Facilities subject to saturation from water or other liquids, and locations exposed to the weather.

Within Reach

Where an employee can touch an unprotected energized conductor from an immediate work position with any part of their body.

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Powered Industrial Trucks (Forklifts) ..... GR – Rule 144
Traffic ..... PS – P-15
Transportation ..... GR – Rule 123
Vehicle Booms, Ladders, and Lifts ..... GR – Rule 125
Work Area Protection and Traffic Control ..... GR – Rule 127

This Subject Index is provided as a guidance document enabling employees to quickly locate common safety/work rules associated with their job classification, and ***is not intended*** *to be an "all-inclusive" source of information. Each employee of the Company shall be provided access to the APM and shall be required to know and understand those sections which apply to the work being performed (APM Policy 4 — Knowledge).*

Eldorado-Ivanpah Transmission Project

Injury & Illness Prevention Program

SOUTHERN CALIFORNIA EDISON®

An EDISON INTERNATIONAL® Company

Corporate Environment, Health & Safety
Program

EHS-CS-PG-001

Injury & Illness Prevention Program

Approved by: _____ *Date:* 07/27/10

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Printed 7/28/2010

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1. Introduction

1.1 Purpose and Scope

Southern California Edison (SCE) is committed to meeting and exceeding the requirements of all environmental, health, and safety (EH&S) laws and regulations applicable to SCE. We have a comprehensive EH&S system that includes programs, procedures, and metrics as well as a variety of tools and resources to ensure that SCE operations are performed in accordance with applicable laws, regulations, and best business practices and provide a safe, environmentally sustainable, and healthful workplace for our employees, our contractors, and the public. The Injury and Illness Prevention Program (IIPP) is an integral part of SCE's EH&S management system.

Regulation

SCE is required under Title 8 of the California Code of Regulations (CCR), Section 3203 to establish, implement, and maintain a written Injury and Illness Prevention Program. Also the General Duty Clause, Section 5(a)(1) of the Occupational Safety and Health Act (OSHA) of 1970 requires employers to provide employees with a place of employment which are free from recognized hazards that may cause or are likely to cause death or serious physical harm to his employees. This Corporate IIPP has been developed to meet this requirement, achieve consistent compliance with safety rules, and ensure safe operations at all SCE locations.

Site IIPP Implementation Plan

Every SCE site with assigned personnel shall establish, implement, and maintain a written IIPP Implementation Plan with site-specific safety information that will help ensure the safety and health of employees while on the job. This site plan provides a common set of tools to enhance the performance of SCE safety initiatives and programs.

Since the site IIPP Implementation Plan relates to all safety programs at the specific work location, it is important to incorporate relevant information from each SCE organization and site information not included in the Corporate IIPP. Section 4 details the requirements of a site IIPP Implementation Plan.

Applicability

This IIPP Program applies to all SCE employees and organizations. The IIPP Program provides the framework and context for the overall health and safety program and establishes SCE's commitment to a culture that creates a safe and healthy environment for our employees. The site-specific IIPP ***does not*** represent the entire safety program for your job or that site.

Changes to this Revision

Added a requirement in Section 4 that a site IIPP shall include a system to ensure that SCE employees serving as a Host provide visitors with basic safety information such as evacuation routes.

Compliance Date

SCE organizations and sites are expected to be in compliance with the requirements of this program by October 1, 2010.

1.2 Overview of the SCE Safety Program

The SCE Safety Program is based on our commitment to achieving an injury-free workplace and the values expressed in Edison International's *Our Commitment to Safety*.

Our Commitment to Safety

We are committed to strengthening our safety culture to achieve an injury-free workplace by creating and sustaining a work environment that values:

Values

- *Having every employee leave the workplace unhurt—anything less is unacceptable;*
- *Using work behaviors and practices that uncompromisingly protect the safety of everyone;*
- *Caring for the safety of each other; and*
- *Stopping work anytime unsafe conditions or behaviors are observed until the job can be completed safely.*

A continuous commitment and dedication to following these values by all of us will assure that the safest workplace is established and the safest work behaviors are always used to prevent injuries.

Safety Program Elements

The SCE Safety Program, which is part of the SCE's EH&S management system, includes a variety of programs, procedures, and other resources and tools to help us continuously improve our safety performance and achieve an injury-free workplace.

Specific and more detailed requirements are contained in such documents as:

- Corporate EH&S policies, programs, and procedures
- SCE safety rules and policies for common work activities - the Accident Prevention Manual (APM)
- SCE Organizations' EH&S policies, programs, plans, and procedures
- SCE Organizations' operational procedures and work instructions

2. Responsibilities

Note: SCE organizations may use different functional titles or may not have the specific functional titles used in this document. However, each SCE organization shall ensure that specific individuals are responsible for implementing the requirements of this program. ***Although the responsibilities listed may be delegated to appropriate personnel for performing specific actions, the identified position/entity is accountable for the results.***

The following SCE organizations and personnel are responsible for demonstrating a visible commitment to safety and effective implementation of our EH&S efforts. This commitment is shown by performing the following as part of their job duties.

Corporate EH&S Director

- Maintains oversight of the all Corporate EH&S initiatives to ensure that SCE meets or exceeds applicable regulations and incorporates best practices to manage EH&S performance.

Corporate Safety Manager

- Serves as IIPP Administrator for implementing and maintaining the Corporate IIPP.
- Provides technical assistance as requested in developing a site IIPP Implementation Plan.
- Reviews and approves IIPP training materials.
- Ensures that an annual program review is conducted.

SCE Organization Executive Management

- Provides visible leadership to all staff within the organization by consistently promoting EH&S compliance while focusing on prevention.
- Fosters a culture that integrates EH&S in all work and ties EH&S with performance.
- Provides adequate resources (people, specialized skills, technology, and financial) to effectively manage organization-specific EH&S programs and plans.
- Monitors EH&S performance and takes corrective or preventive action when needed.

- Ensures that management tools (such as personnel reviews, coaching, recognition, and discipline) are in place to measure and promote EH&S performance.

Site EH&S Manager

The Site EH&S Manager has ultimate responsibility for implementation of EH&S requirements at the site. Working with the Site EH&S Team, the Site EH&S Manager helps to coordinate EH&S activities across all SCE organizations located at the site.

- Serves as or designates an individual to serve as the site IIPP Implementation Plan Administrator, who ensures that the site IIPP Implementation Plan is implemented and maintained in accordance with this program.
- Understands and effectively communicates relevant rules, processes, and procedures.
- Serves as the liaison among the different SCE organizations at the site, Safety and Environmental Specialists (SESs), and organization EH&S management.
- Ensures that site EH&S Plans are implemented as required.
- Ensures resources are allocated for the correction of safety deficiencies.
- Ensures EH&S inspections and training records are maintained.
- Leads Site EH&S Team, and support investigations, causal analyses, and EH&S training.

SCE Organizations Managers

- Provides visible leadership to all staff within the organization by consistently promoting EH&S compliance while focusing on prevention.
- Fosters a culture that integrates EH&S in all work and ties EH&S with performance.
- Routinely identifies issues related to employee safety and health and the environment.
- Creates a trusting relationship among employees that encourages prompt disclosure of accidents, near misses, and environmental events.

- Holds employees accountable for annual EH&S performance objectives.
- Ensures that organization-specific EH&S policies and processes are implemented.
- Monitors implementation of the organization's EH&S efforts.
- Conducts EH&S risk assessments and implements control processes to manage risks.
- Ensures management tools (such as personnel reviews, coaching, recognition, and discipline) are in place in order to measure and promote EH&S performance.
- Incorporates EH&S performance in the performance review process.

Organization EH&S Staff

- Understands and communicates relevant EH&S rules and procedures.
- Works with the Site EH&S Manager to ensure that required EH&S initiatives (e.g., plans, programs, policies, and the APM) are consistently used in the performance of work.
- Supports the Site EH&S Team and organization safety and environmental teams.
- Assists as requested with the EH&S self-assessment process established for their organization.
- Recommends corrective actions and follow-up implementation of the corrective actions.
- Supports incident investigations and root cause analysis.
- Supports EH&S training.
- Champions changes in EH&S rules, processes, and procedures.
- Identifies any gaps with EH&S rules, processes, and procedures to the Site EH&S Manager and the organization's EH&S Management.

Construction Project Managers

- Develops a project-specific Code of Safe Practices when SCE employees are involved in construction work that involves:
  - Installation or erection of substantially new equipment (as for a process change) or structures (buildings).
  - Excavation
  - Demolition or salvage of structures

Notes: Refurbishing of existing equipment and space is considered maintenance work and is not covered under construction. Drilling or digging holes for power poles or trenches to place electric utility cable is not considered excavation.

The project-specific Code of Safe Practices does not represent the entire safety program for the construction work.

- Ensures that the project-specific Code of Safe Practices is posted or is provided to each supervisory employee who shall have it readily available at the construction job site.
- Ensures that all employees in the construction work group understand and obey the project-specific Code of Safe Practices developed.
- Ensures employee compliance by taking action as necessary.

Supervisors/ Employee in Charge

- Champions the use of safety situational and consequential awareness, error reduction programs such as STOP (Stop, Think, Observe, and Perform), and effective prevention tools such as job hazard analyses (JHAs) and "what-if" analyses in pre-job briefings.
- Ensures that all necessary or appropriate safety and environmental measures and procedures are considered and put in place before beginning work.
- Ensures clear understanding and knowledge of safe work procedures including all EH&S policies, programs, and procedures applicable to his/her work area as identified by SCE organization management.
- Consistently reinforces the use of safe work practices during day-to-day operations.
- Ensures that employees use and maintain all personal protective equipment (PPE) devices, equipment, and safeguards as appropriate.
- Ensures that all employees in the work group understand safety practices and rules.

- Ensures that employees in the work group receive the appropriate safety training.
- Performs assigned periodic EH&S inspections and surveys of tools, vehicles, and machinery in the work area.
- Takes immediate steps to correct unsafe conditions within his/her authority and ability. Takes temporary precautionary measure when an unsafe condition cannot be immediately corrected.
- Reports all close calls, incidents, and injuries in accordance with the organization's policy and procedure.
- Assists in accident investigations and analyses and promptly submits a report according to organization guidelines.

Employees

The success of the site safety programs depends on each individual accepting his or her safety responsibilities and accountabilities and incorporating them into their daily work.

All SCE personnel, both stationed at a site (regardless of which SCE organization that they report to) and who visit a site, are expected to:

- Comply with the directions of the Site EH&S Manager and the safety rules contained in this document (refer to APM P-2).
- Know the job being performed.
- Identify the hazards and understand the risks in the work environment.
- Take appropriate steps to mitigate hazards.
- Actively participate in prejob briefings, active tailboards, and other types of work-related safety discussions.
- Maintain EH&S situational and consequential awareness while performing work.
- Follow the general EH&S rules as well as the rules specific to the position (e.g., qualified electrical worker), and use appropriate PPE when and where required.
- Use error reduction techniques such as peer-check and self-check.
- Help safeguard fellow employees.

- Use effective work group/team communication skills.
- Report all close calls, incidents, and injuries in accordance with the organization's policies and procedures.
- Actively participate in EH&S training and use the knowledge and skills learned in training on the job.
- Understand and follow what to do in an emergency.
- Identify and discuss improvements needed in EH&S programs.

3. Program Elements

The IIPP is a comprehensive program that identifies the safety management tools used at SCE to ensure effective implementation of our safety programs.

Program elements

The required elements of an IIPP are as follows:

- IIPP Responsibility
- Safety Compliance
- Safety Program Communication
- Hazard Assessment
- Accident, Close Call, and Exposure Investigations
- Hazard Correction
- Training and Instruction
- Recordkeeping

3.1 IIPP Responsibility

The Manager of Corporate Safety serves as IIPP Administrator for implementing and maintaining the Corporate IIPP.

3.2 Safety Compliance

All employees, including managers and supervisors, are responsible for complying with safe and healthful work practices (refer to APM P-2 and P-10). This includes the safety policies in the APM, Corporate and SCE organizations' Safety Programs, Safety Division Orders, and other safety communications. Attachment A contains an example of Code of Safe Practices for Construction. See the definition of SCE Construction Work. ***These are suggested safe practices and intended as a basis for preparation by the SCE Construction Project Managers or designee and are not meant to be all-inclusive.***

In addition, the SCE system for ensuring that all workers comply with these practices includes the following:

- Providing every employee with a copy of the SCE APM, safety programs, and organization/site safety programs and plans relevant to their assigned work
- Reinforcing the use of approved PPE (e.g., hard hat, fire-resistant clothing, eyewear, gloves, and hearing protection)
- Prohibiting personnel from selectively choosing when they will follow the rules or follow only certain rules because "they know when it's safe to bend the rules"
- Holding all personnel accountable for safety rule violations
- Evaluating the safety performance of all employees
- Recognizing employees for superior performance
- Disciplining workers for failure to comply with safe and healthful work practices and providing additional training as needed (using the organization's "progressive discipline" procedures)

3.3 Safety Program Communication

All managers and supervisors are responsible for communicating with site personnel the importance of preventing work injuries and illnesses.

Safety Committees/Teams should be established to assist with the open sharing of knowledge and to respond to questions in a timely manner. Safety Committees/Teams are also an important forum to assist with the implementation of new ideas from all site organizations.

Crew and Work Group Communications

With respect to crew and work group communications, it is important to:

- Be clear with respect to expectations and identify the appropriate methods for all personnel to avoid high-risk situations.
- Reinforce the requirements to follow the rules and the use of PPE and appropriate error reduction tools.
- Avoid the use of conflicting safety messages.

The site safety communication system may include:

Site Safety communication

- New worker orientation including a discussion of safety and health policies and procedures

- A review of relevant sections of the APM and site's IIPP Implementation Plan
- Regularly scheduled safety meetings (e.g., Monday morning safety topics for work crews)
- Posted or distributed safety information
- A system for workers to inform management about workplace hazards without fear of reprisal (refer to APM P-18)
- The Ethics and Compliance Helpline to anonymously report conditions that do not support the SCE commitment to employee safety

Safety information for visitors

The site IIPP shall include a system to ensure SCE employees serving as a Host provide visitors with basic safety information such as evacuation routes. See Attachment B for an example of the type of information to be reviewed with a visitor.

3.4 Hazard Assessment

Hazard assessment is an ongoing process of identifying and evaluating hazards. This process is an integral part of our work. Typical techniques and tools for hazard assessment and for maintaining situational and consequential safety awareness are:

- Conducting inspections
- Assessing the work environment
- Performing pre-job briefings
- Using error reduction tools
- Maintaining communication
- Identifying changes that require revisions

Conducting inspections

Periodic inspections shall be performed to identify and evaluate workplace hazards (see APM P-19). In addition, some programs and plans have specific inspection requirements.

Assessing the work environment

When crews or work groups are getting ready to work, assess the work environment and identify any potential environmental or safety hazards. Think about and plan for what could be the worst thing that could happen. Review the existing job hazard analysis (JHA).

If needed, perform or request new JHA at the job site for the particular job. If anything new or unusual in the work method (tools, materials, etc.) could create a risk, decide along with the crew whether the risk can be eliminated or reduced. Include the results of the risk analysis in the pre-job briefing.

Performing pre-job briefings

Perform a pre-job briefing or tailboard that lets everybody know the work method—who is going to do what and in what order. List the environmental and safety risks and clearly decide how these risks will be avoided. Confirm that all crew members understand their role. After lunch or if things change, update your plan and reinforce the agreed upon work method.

Using Error Reduction Tools

Develop, implement, and encourage the consistent use of error reduction tools including peer-check and self-check. Maintain situational awareness by being aware of the current situation and how things are going. Be willing to stop the job to avoid error. Use peers to check understanding of the task, confirm that the process is sound, and confirm that you have protected against errors. Remember to watch out for each other and speak out to protect each other from injury or environmental events. Use formal error reduction tools such as QVV (Qualify, Validate, and Verify), STAR (Stop, Think, Act, Review), STOP (Stop, Think, Observe, and Perform), and ACE (Anticipate, Concentrate, and Evaluate).

Maintaining communications

Encourage the use of effective crew communication. Use simple language and be clear when talking. Make sure you are understood; look and listen for confirmation. When spoken to, provide concise replies to confirm understanding. Give positive feedback when things go right and helpful suggestions when things need to be improved.

Identifying changes that require revisions

Refresh these programs and skills regularly, and specifically when:

- New substances, processes, procedures, or equipment that may present potential new hazards are introduced.
- New, previously unidentified hazards are recognized.
- Significant occupational injuries and illnesses occur.
- Site conditions warrant an inspection.

3.5 Accident, Close Call, and Exposure Investigations

Procedures for investigating workplace accidents and hazardous substance exposures are outlined in APM P-3, APM P-14, Edison System of Manuals (ESM) 40.010.005, Accident Reporting and Investigation.

Note: Injuries and illnesses at work must be reported as quickly as possible. The Corporate Reporting Injuries and Illnesses at Work Program, (EHS-CS-PG-010) outlines the roles, responsibilities, and minimum standards for reporting injuries and illnesses at work. This program also contains the corporate reporting processes for SCE organizations in California and Nevada.

Site (local) and close call investigations are performed for minor events; Department and Corporate investigations are performed for more serious events and close calls. The intent of these investigations is to:

- Examine the factors within the workplace for contributing factors associated with the accident/exposure.
- Identify the root cause(s) of the accident/exposure.
- Take corrective action(s) to prevent the accident or exposure from reoccurring.
- Record the findings and actions taken.

3.6 Hazard Correction

Unsafe or unhealthy work conditions, practices, or procedures shall be corrected in a timely manner, based on employee input, safety self-assessments, periodic inspections, routine preventative maintenance, job hazard assessments, or accident, close call, and exposure investigations.

When an imminent hazard exists that cannot be immediately abated without endangering employee(s) and/or property, remove all exposed employees from the area except those necessary to correct the existing condition. Employees who are required to correct the hazardous condition shall be provided with the necessary protection.

Note: Safety inspection forms or their equivalent can be used to document and monitor progress of hazard correction.

3.7 Training and Instruction

Categories of training

All employees, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices (See APM- P-5). This training is divided into four categories:

- General EH&S training for all site personnel
- Awareness training for all potentially impacted personnel

- Skills training for qualified or designated workers
- Implementation training for managers and supervisors

Who receives training

The Site SES may assist in determining how EH&S training will be delivered.

In general, training and instruction are provided to:

- All new workers
- All workers given new job assignments for which training has not provided previously
- Supervisors to familiarize them with the safety and health hazards to which workers under their immediate direction and control may be exposed
- All workers with respect to hazards specific to each employee's job assignment

Real time training

In addition, training shall be provided:

- When new substances, equipment, processes, or procedures are introduced to the workplace and represent a new hazard
- When site management is made aware of a new or previously unrecognized hazard

Suggested topics

As part of the site safety meetings, safety communication materials, and safety committee/team discussions, the following topics should be covered (refer to APM P-9):

- Implementation of the Emergency Action and Fire Prevention plans (refer to APM P-16)
- Provisions for medical services and first aid including emergency procedures (Refer to APM Section 1000, First Aid Rules, and the First Aid Response Guidelines Fact Sheet).
- Use of stretching and proper technique to prevent musculoskeletal disorders
- Importance of good housekeeping, such as keeping stairways and aisles clear, keeping work areas neat and orderly, and promptly cleaning up spills (refer to APM P-19).

- Prohibiting horseplay, scuffling, or other acts that tend to adversely influence safety (refer to APM P-11)
- Importance of proper storage of materials to prevent stacking goods in an unstable manner and storing goods against doors, exits, fire extinguishing equipment, and electrical panels.
- Reasons and methods for proper and timely reporting of hazards, close calls, and injury/illness to supervisors (Refer to APM P-14).
- Hazard communication, including worker awareness of potential chemical hazards, and proper labeling of containers (Refer to Corporate Hazard Communication and Chemical Management Program, EHS-CS-PG-004).
- Proper storage and handling of toxic and hazardous substances including prohibiting eating or storing food and beverages in areas where they can become contaminated.

3.8 Recordkeeping

All site safety records and key documents shall be maintained either on site or in SCE computer-based recordkeeping and documentation systems. These records shall be maintained in accordance with the SCE ACT document control procedures. The site's SES may assist in determining how records will be maintained.

The following records must be maintained:

- Records of safety communication (safety meetings, etc.)
- Inspection records and records of hazard correction
- Completed accident, close call, or exposure investigation reports
- Safety-related training received by each employee

4. Site IIPP Implementation Plan Requirements

The site IIPP Implementation Plan is designed to improve the implementation and coordination of Corporate and SCE organizations safety programs, APM safety policies and rules, and Station or Division Orders.

Consistent set of safety management practices

The purpose of the site IIPP Implementation Plan is to incorporate site-specific information to assist with the effective implementation of SCE safety programs at the site.

The site IIPP Implementation Plan shall be amended as needed to reflect current conditions, for example when key staff mentioned in the plan change, when new or previously unidentified hazards are identified, or when operations change at the site.

The contents of a site-specific IIPP Implementation Plan are shown in Table 1 below.

Table 1. Site-Specific IIPP Implementation Plan Elements

IIPP Element	Site-Specific Content Required
Responsibility for Administering the IIPP Implementation Plan	Identify an IIPP Implementation Plan administrator.
Safety Compliance	Describe any SCE organization and site-specific policies, programs, systems, or processes used to ensure that employees comply with the requirements of the IIPP, for example: • System for rewards, recognition, and discipline for safety-related behaviors • Methods to provide added training to those employees whose safety performance is deficient
Safety Program Communication	Describe any SCE organization and site policies, programs, systems, or processes used to ensure that safety information is communicated to employees, for example: • Media (bulletin boards, etc.) used to communicate safety-related information • Information on safety committees/teams such as members and meeting schedule • Information on safety meetings including schedule, attendees, agenda, and follow-up process • Use of pre-job briefings and error reduction and situational and consequential awareness techniques • Information for visitors. See Attachment B.

IIPP Element	Site-Specific Content Required
Hazard Assessment	Describe any SCE organization and site policies, programs, systems, or processes used to ensure that hazards are identified and evaluated, for example: • A system for workers to inform management about workplace hazards without fear of reprisal • Inspection process including, schedules, forms, training, and recordkeeping
Accident, Close Call, and Exposure Investigations	Describe any SCE organization and site policies, programs, systems, or processes used to ensure that investigations are conducted systematically, for example: • System for investigating accidents, close calls, and exposure investigations (Include any forms and recordkeeping requirements.)
Hazard Correction	Describe any SCE organization and site policies, programs, systems, or processes used to ensure that identified hazards are corrected, for example: • System for ensuring that hazards have been corrected, including personnel responsible, estimated timeframe for correcting, priority assignments, and follow-up to ensure hazard is corrected
Training and Instruction	Describe any SCE organization and site policies, programs, systems, or processes used to ensure that employees receive the appropriate safety training and education, for example: • EH&S Training Profile for each employee • Safety training as defined in the various site EH&S plans

IIPP Element	Site-Specific Content Required
Recordkeeping	Describe any SCE organization and site policies, programs, systems, or processes used to ensure that appropriate records are maintained, for example: • Records of safety communication (Safety Meetings, etc.) • Inspection records and records of hazard correction • Completed accident, close call, or exposure investigation report • Safety-related training received by each employee

5. Performance Monitoring

The Corporate Safety Manager or designee shall conduct an annual review of the Program. This review includes assessing any new regulatory requirements or changes to existing regulatory requirements and identifying any opportunities for improvements to the program.

6. Definitions

Construction Work

For the purpose of this program, the following types of activities constitute construction work when SCE employees are involved:

- Installation or erection of substantially new equipment (as for a process change) or structures (buildings)
- Excavation
- Demolition or salvage of structures

Note: Refurbishing of existing equipment and space is considered maintenance work and is not covered under construction. Drilling or digging holes for power poles or trenches to place electric utility cable is not considered excavation.

Any of the above type of construction work requires a project-specific Code of Safe Work Practices to be developed.

Qualified person

An employee who by reason of experience or instruction is familiar with the operation to be performed and the hazards involved.

7. References

Regulation

Title 8 of the California Code of Regulations, Section 3203, Injury and Illness Prevention Program

http://www.dir.ca.gov/title8/3203.html

Title 8 of the California Code of Regulations, Section 1509, Injury and Illness Prevention Program (Construction)

http://www.dir.ca.gov/Title8/1509.html

National Standard

American National Standards Institute (ANSI) A10.3 1977, Safety Requirements for Power Activating Fastening Systems

Corporate EH&S Documents

The following documents may be found on the Environment, Health, and Safety page of the Edison Portal at Safety & Environment>Environment, Health and Safety>Topics

- Reporting Injuries and Illnesses at Work (EHS-CS-PG-010)
- Accident Prevention Manual (APM)
  - APM General Rule 126, Cranes, Hoists, Derricks, Booms, and Winches
  - APM General Rule 127, Work Area Protection and Traffic Control
  - APM General Rule 128, Barrier Tape and Guard Rails
  - APM General Rule 129, Removing Safety Guards
  - APM General Rule 134, Portable Ladders
  - APM General Rule 144, Powered Industrial Trucks
  - APM Rule 167, Operating Procedures, Utilized for Towering Work
  - APM 1000, First Aid Rules
- Corporate Hazard Communication and Chemical Management Program (EHS-CS-PG-004)
- Corporate Hazardous Energy Control (Lockout/Tagout) Program
- Corporate Heat Illness Prevention Program

- The First Aid Response Guidelines Fact Sheet (EHS-CS-FS-001)

Edison Policy and Procedure Central Edison Portal at Policies>Edison Policy and Procedure Central (EPPC) (ESM)>Procedures>

- Corporate Accident Reporting and Investigation Policy (ESM 40.010.005)

8. Review/Revision History

Rev.	Date	Description of Revision	Contact
0	02/21/06	Initial distribution	W. Messner
1	07/10/07	Added Code of Safe Practices for Construction Work	W. Messner
2	12/01/08	Minor editorial and clarification changes made based on annual review and stakeholder feedback. Specified the items that are mandatory for recordkeeping under IIPP Updated approval signatures and reference for the Edison Portal.	W. Messner
3	12/1/09	Minor editorial and clarification changes made based on annual review and stakeholder feedback. Updated references	W. Messner
4	06/01/10	Added a requirement in Section 4 that a site IIPP shall include a system to ensure SCE employees serving as a Host provide visitors with basic safety information such as evacuation routes.	W. Messner

9. Attachments

Attachment A. Example of Code of Safe Practices for Construction

Attachment B. Example of Safety Information to Provide to Visitors

Attachment A. Example of Code of Safe Practices for Construction Work

The following pages contain examples of the Code of Safe Practices for Construction Work. The Code of Safe Work Practices has been developed per the requirements of Title 8 California Code of Regulations (CCR) 1509, specifically in accordance with the Construction Safety Work Orders. ***These are suggested safe practices and intended as a basis for preparation by the SCE Construction Project Managers or designee. It is not meant to be all-inclusive or to replace other additional safety and precautionary measures to cover usual or unusual conditions.*** A Construction Project Manager is responsible for customizing this code to address issues specific to a construction project. Project Managers can also use relevant sections of the SCE Accident Prevention Manual (APM), appropriate Corporate polices, programs, and procedures, including SCE Organizations' operational procedures and work instructions for additional information on specific topics.

Project Managers are responsible for overseeing their employees to ensure that they obey rules and regulations, thus promoting a safe work environment and taking action as necessary to ensure employee compliance.

A Code of Safe Practices shall be developed when SCE employees are engaged in construction activities that involve:

- Installation or erection of substantially new equipment (as for a process change) or structures (buildings)
- Excavation
- Demolition or salvage of structures

Note: Refurbishing of existing equipment and space is considered maintenance work and is not covered under construction. Drilling or digging holes for power poles or trenches to place electric utility cable is not considered excavation.

The Code of Safe Practices listed below is general in nature and covers only the following areas:

- Requisite Knowledge and Resources
- General Code of Conduct
- Housekeeping and Site Cleaning
- Sanitation
- Emergency Medical Services
- Personal Protective Equipment (PPE)
- Scaffolds
- Portable Ladders
- Rigging
- Electrical Safety
- Work Area Protection, Signage, and Traffic Control
- Hazardous Materials
- Material Handling
- Hand Tools, Power Tools, and Equipment

- Compressed Gas and Oxygen
- Equipment and Vehicles
- Trenches, Excavations, and Earthwork
- Outdoor Heat Stress

Note: "OSHA" refers to either the California Division of Occupational Safety and Health (Cal/OSHA) or the Federal Occupational Safety and Health Administration (OSHA) as is applicable.

Requisite Knowledge and Resources

Safety policies, rules, programs, and plans

All employees shall familiarize themselves with these safe practices, as well as all the appropriate Corporate, site-specific, and job-related safety programs and plans.

Training

- No employees shall be allowed to work on any jobsite until they have received an appropriate New Employee Orientation, as outlined in the IIPP.
- All employees shall be provided with training as it pertains to their job tasks prior to beginning work.
- Safety topics relevant to each job shall be reviewed at tailgate meetings or pre-job briefing.

Supervisor responsibilities

- Understand the construction Code of Safe Practices developed for the construction project.
- Ensure the Code of Safe Practices is posted at a conspicuous location at the construction project or SCE job site office or have it readily available for employee review.
- Provide their employees with Code of Safe Practices at their initial orientation for the job.

Employee responsibilities

- Employees are responsible for understanding and following the Code of Safe Practices developed for the construction project.

General Code of Conduct

1. All employees are responsible and accountable for working safely and productively, while remaining aware of the hazards of their jobs and following recognized safe job procedures.
2. Employees shall know how to respond in the event of a fire or other emergency evacuation/situation.

3. Each employee shall use reasonable care in the performance of duties, and act in such a manner as to assure safety and health to themselves, their coworkers, and the public.
4. Employees shall follow safe and correct work procedures as applicable to the work tasks being performed and not substitute potentially unsafe faster procedures for safe procedures.
5. Employees shall report all unsafe conditions and equipment immediately to the Supervisor.
6. Employees shall report all accidents, injuries, or occupational illnesses immediately to the Supervisor.
7. Employees shall not engage in practical jokes, scuffling, "horseplay," or the urging of persons to take unnecessary chances.
8. Substance abuse or other conditions that adversely affect the employee's safety, health, and behavior are not allowed at the workplace.
9. Weapons are not permitted in the work environment.
10. Anyone known to be under the influence of drugs or intoxicating substances that impair the employee's ability to safely perform the assigned duties shall not be allowed on the job site.
11. No employee shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that it might unnecessarily expose the employee or others to injury.
12. Employees working in hot environments shall drink plenty of fluids and take frequent breaks to avoid heat stress.
13. Employees shall not enter manholes, underground vaults, chambers, tanks, silos, or other similar places that receive little ventilation, unless authorized and when it has been determined safe to enter.

Housekeeping and Site Cleaning

Jobsite housekeeping is every employee's responsibility. Here are some examples of your responsibilities:

1. Keep storage areas, stairways, aisles, exits, roadways, walkways, and material storage areas in yards reasonably free of dangerous projections, obstructions, and debris. Nails in scrap lumber must be bent down or removed.
2. Use a proper container to dispose of trash lumber, debris, and scraps.
3. Trash, garbage, or waste containers shall not be allowed to overflow.
4. Store and stack material and supplies in an orderly manner to prevent their falling or spreading and to eliminate tripping and stumbling hazards.
5. Keep flammable materials such as paint and cleaning fluid in a proper storage container.
6. Dispose of combustible materials, such as oil-soaked and paint covered rags, waste, shavings, packing, and rubbish only in areas provided for that purpose.
7. Section off and clean up all spills immediately if trained and authorized.
8. Do not leave tools or materials where they can create a tripping hazard. Never lay electric cords, welding cables, hoses, or ropes across stairways, walkways, or hot lines. Instead route them off paths of travel and free from potential damage.
9. Do not use solvents for cleaning unless a special permit has been issued. Cleaning clothes, gloves, etc., with compressed air or solvents is prohibited.
10. Maintain clear access to and around fire, safety, and other emergency equipment at all times, so that they will be readily accessible.
11. Keep all exposed protruding rebars or similar projections guarded with approved covers or troughs to prevent impalement.

Sanitation

1. Report to work with clean work clothes. Good personal cleanliness will reduce the potential for health hazards on the job.
2. Wash hands frequently and thoroughly, especially after handling hazardous, injurious, or poisonous substances. As a general rule, hands should be washed just before eating.
3. To avoid skin irritation, use proper PPE and personal hygiene practices. Whenever you come in contact with any irritating substances, be sure to wash the affected areas at once with soap and water. Avoid prolonged skin contact with all petroleum products.
4. Ensure that potable drinking water containers are clearly marked as to contents and not used for other purposes.
5. Fill potable water in dispensers from a confirmed potable water source.
6. Store single serving cups in bags to prevent contaminants from accumulating on them.
7. Keep toilet and washing facilities clean, and in good working order. Such facilities shall have toilet paper, disinfecting solution or soap, and single use towels.

Emergency Medical Services

SCE's goal is that first aid is provided as quickly as possible and that the health and safety of the first responder is protected. The First Aid Response Guidelines Fact Sheet, EHS-CS-FS-001 provides guidelines for responding to a first aid response incident. Proper equipment for prompt transport of the injured or ill person to an emergency medical facility or an effective site-specific communication system for calling an emergency medical facility, ambulance, or fire service shall be provided. Telephone numbers for listed emergency services shall be posted. SCE first aid kits are provided at the job site and shall contain the minimum of supplies.

1. Know your site emergency procedures. Know how to report an injury and where to go to get medical help.
2. Trained personnel with a current American Red Cross First Aid certificate or equivalent should render first aid treatment.

3. First aid and medical equipment is for emergency use only. Do not tamper with it or use it for any other purpose. If you use some of this equipment, report it, so that it can be replaced.

Personal Protective Equipment (PPE)

1. Wear proper PPE, including safety glasses, goggles, hard hats, safety shoes, gloves, protective clothing, and respirators as appropriate and required.
2. Understand the use and limitations of your PPE.
3. Follow the manufacturer's instructions for the use, care, and storage of PPE.
4. Keep PPE clean and in good repair. Do not use equipment used by other employees unless it has been properly cleaned.
5. Do not modify PPE in any way. If your equipment is uncomfortable or doesn't fit properly, check with your supervisor.
6. Do not use damaged or defective PPE.
7. Approved safety glasses shall be worn when work involves the following:
   - The handling of exposed energized parts of equipment or systems energized at 120 volts or more between conductors
   - Drilling or chipping stone, brick, concrete, paint, pipe coatings, or metal
   - Grinding, buffing, or wire brushing, whether there is a guard or not
   - Dust or flying particles
   - Welding, cutting, or burning
   - Use of hot or dangerous substances
   - Injurious light or heat rays
   - While mixing or working around injurious chemicals
   - When wearing a face shield where eye protection is required
   - Any other job where there is recognized danger of eye injury
   - In any areas where "Eye Protection Required" signs are posted

8. Hearing protection shall be worn:
   - In any areas where "Hearing Protection Required" signs are posted
   - In areas with noise levels at or above 85 dB on an eight-hour time-weighted average
   - If an employee has a hard time holding a conversation at arm's length
9. Hard hats shall be worn:
   - When employees are working above you
   - When there is a possibility of things falling on you
   - In any areas where "Hard Hat Required" signs are posted
10. Wear clothing and footwear appropriate for the job.
11. Wear appropriate gloves if your work involves unusual or excessive risk to your hands of cuts, burns, or exposure to harmful physical or chemical agents. The only exception is when the gloves might get caught in moving machinery or materials.
12. Do not use respiratory protective equipment unless you are medically cleared, trained, certified, and fit-tested.
13. Work shoes shall be in good repair. Do not wear inappropriate footwear or shoes with thin or badly worn soles. Be aware of surrounding areas and ensure proper footing to avoid trips and falls. Sandals, tennis shoes, soft upper shoes, and canvas shoes are not allowed as standard work shoes.

Note: Some projects may require steel toe/ reinforced plastic work boots.

14. Jobsite fall protection assessments shall be made by competent person trained in fall protection, and they shall oversee all fall protection equipment, maintenance, usage, and training.

Scaffolds

The following Code of Safe Practices set forth common sense procedures for safely erecting, dismantling, and using scaffolding equipment only. However, equipment and scaffolding systems differ, therefore always refer to the instructions and procedures of the supplier and or manufacturer of the equipment.

1. Scaffolds must be erected in accordance with design and or manufacturers' recommendation.
2. Do not erect, dismantle, or alter a scaffold unless under the supervision and direction of a qualified person.
3. Prior to use, read and understand the scaffold inspection tags. All scaffolds shall be certified safe for use prior to allowing workers on the scaffold.
4. Prior to use, inspect scaffold to insure it has not been altered and is in safe working condition.
5. Erected scaffolds and platforms should be inspected continuously by users to be sure that they are maintained in safe condition. Report any unsafe condition to your supervisor.
6. Do not work on scaffolds if your physical condition is such that you feel dizzy or unsteady in any way.
7. Exercise caution when entering or leaving a work platform.
8. Do not overload scaffold. Follow safe working load recommendations. Scaffolding shall be of sufficient strength and rigidity to support the weight of personnel and material to which it will be subjected.
9. Do not jump onto planks or platforms.
10. Do not attach boards, ladders, or other makeshift materials to top rails to increase the scaffold height or provide access from above.
11. Do not climb the frame of a scaffold to access work levels.
12. Each level of the scaffold shall have an access ladder securely attached to the scaffold frame. Climb in access areas only and use both hands.
13. Do not climb the frame of a scaffold to access work levels.
14. All scaffold accessories shall be used and installed in accordance with the manufacturer's recommended procedures. Accessories shall not be altered.

Portable Ladders

Use of ladders shall comply with all applicable OSHA regulations and safety instructions and design specifications of the equipment, such as proper placement, secure support, adequate weight rating, allowable height, and appropriate working condition. Users should also refer to APM General Rule 134.

1. Use ladders designed for the job being performed (e.g., no metal ladders for electrical work).
2. Use ladders that have been inspected and certified safe.
3. Remove unsafe ladders from the job site immediately. Ladders with bent, missing, or damaged parts are not allowed on the jobsite.
4. Dispose of damaged ladders that cannot be repaired.
5. Make sure the ground that you place your ladder on is level and stable.
6. Never use aluminum ladders in areas near electrical sources.

Rigging

This section describes general safety procedures to be followed when hand rigging or when working around heavy rigging operations. Additional safety requirements may apply if you are performing heavy rigging. Crane operators should also refer to all crane safety procedures, crane operating manual, APM general rule 126, Cranes, Hoists, Derricks, Booms, and Winches, etc. Rigging activities shall be performed ONLY by trained personnel.

1. Know the load capacity of your equipment and the weight of the gear you will be lifting or lowering. Do not exceed load limits.
2. Inspect all hardware, equipment, tackle, and slings prior to each use. Report any defects or damage to your supervisor. Do not use damaged or defective rigging equipment.
3. Do not use chain-falls and come-alongs that do not have current inspection tags on them.
4. Keep rigging operations away from power lines.
5. Follow rigging procedures. Do not take short cuts. Follow these general safety precautions when lifting and lowering loads:

- Avoid sudden jerking when lifting or lowering loads.
- Use a tag line to control suspended loads.
- Keep loads from swinging and keep the hoist lines plumb at all times.
- Never walk under or stand under a suspended load, or allow anyone else to do so.
- Keep hands away from pinch points as slack is taken up.
- Never ride on a suspended load, or allow anyone else to do so.
- Do not leave a suspended load unattended.
- Keep people clear of any area where they might be injured if a load slips, breaks loose, or swings out of control.

Electrical Safety

All connecting, disconnecting, repair, adjustments, or other work performed on electrical equipment shall be performed by qualified personnel only. This section provides basic guidance for electrical safety and does not cover all the requirements.

General

1. Consider all electrical circuits, wiring, and equipment as live and hazardous, unless they are properly de-energized or tagged as safe by a qualified person.
2. Electrical cords and trailing cables shall be covered, elevated, or otherwise protected from damage.
3. Properly ground all electrical equipment. Do not use equipment that is missing a grounding plug or attachment and notify your supervisor.
4. Keep circuit boxes and switchboxes closed when not in use or being worked on.
5. Do not use metal ladders around electrical wiring or equipment.
6. Keep all cranes, booms, and other aerial equipment at least 10 feet away from overhead lines. More separation distance may be required for lines more than 50,000 volts.
7. The use of extension cords shall be temporary and limited as much as possible.

8. Flexible cords shall be Type S and cannot be spliced unless they are size No. 12 or larger.

9. Any defective equipment or damaged cords shall be removed from the jobsite. Cords cannot be repaired by covering the damage with tape.

Ground fault circuit interrupter (GFCI)

10. GFCI protection shall be used on all 120-volt, AC, single-phase, 15- and 20-ampere receptacles that are not a part of the permanent wiring of the building or structure.

11. Assured equipment grounding conductor program may be used in lieu of GFCI requirement.

Lockout and/or Tagout (Hazardous Energy Control) and Clearances

12. A hazardous energy control (lockout/tagout) procedure shall be developed to prevent inadvertent movement of machinery or equipment or release of stored energy that could cause injury to employees. This rule is not applicable to transmission or distribution lines or substation electrical equipment. See Corporate Hazardous Energy Control (Lockout/Tagout) Program for more guidance.

13. Obtain clearance or report to, and work under, a qualified employee who holds a clearance before starting work on de-energized equipment, apparatus, or lines for which clearances are required.

Work Area Protection, Signage, and Traffic Control

Approved warning signs, barriers, guards, flags, and lights at night, shall be installed and properly maintained wherever hazards exist due to moving or stationary vehicles, exposed energized parts, open excavations, construction operations, open walk-in vaults, or open underground structures. Approved equipment and methods for work area protection are displayed in the Work Area Protection and Traffic Control Manual. (Refer to APM General Rule 127, 128, and 129 for additional rules.)

1. Obey all safety signs/icons/graphics including, but not limited to, the following:

   - Eye Protection Area
   - Hearing Protection Required
   - Respiratory Protection Required
   - Hard Hat Area

- Electrical High Voltage Hazard
- Slippery Floor
- No Eating, Drinking, or Smoking
- Asbestos, Lead, and Hexavalent Chromium
- Radiological Regulations

2. Physical barricades, guardrails, and/or covers are placed around open excavations, unguarded elevated work surfaces, floor and wall openings, and unattended confined spaces. Do not remove safety guards except on approval of the foreman, supervisor, or other person in charge, and after necessary steps have been taken to ensure the safety of employees and the public.

3. Only properly instructed personnel shall be used as flaggers.

4. Flaggers shall wear approved vests and they shall be reflectorized when worn at night or during hours of darkness.

5. Employees on foot and exposed to the hazard of vehicular traffic shall wear traffic vests. Once traffic control has been established these vests are no longer required.

Hazardous Materials

It is SCE's policy that before being introduced into the workplace, all chemicals used on its premises must be the most benign available and be as effective as their alternatives. This section provides basic guidance for handling hazardous materials and does not cover all the requirements.

1. Prior to handling any hazardous materials, substances, or chemicals, be familiar with and abide by the instructions and recommendations contained in the Material Safety Data Sheets (MSDSs).

2. Keep sleeves rolled down, and wear approved respirator, aprons, gloves, eye, and face protection, as prescribed to prevent personal injury when handling hazardous materials, substances, or chemicals.

3. Be familiar with the location of eye-wash stations, emergency showers, wash basins, and the hazardous materials spill kits.

4. Thoroughly wash the affected area with water if hazardous chemicals contact the skin. Immediately flush affected area with water and notify your supervisor if cuts, skinned areas or abrasions, eyes, nose, or mouth are contacted by hazardous chemicals.
5. Wash hands before leaving the area after handling equipment containing chemicals.
6. Take reasonable safeguards, including protection against earth tremors, in storing hazardous chemicals to prevent injury to persons or property.
7. Do not store containers of strong reducing agents such as concentrated hydrazine next to containers of strong oxidizing agents such as chromate or dichromate salts.
8. Ensure that all chemical containers are properly marked.
9. Promptly clean up any spills using appropriate materials if trained and notify your supervisor.
10. Store open containers of the concentrated liquid ammonia or chlorine solutions in a well-ventilated area. Use caution when pouring or pumping these solutions into open containers.
11. Never remove asbestos and other materials that are contaminated with arsenic, lead, or other toxic materials unless certified. Employees shall be properly protected from the exposure. Such materials shall be contained so that environmental contamination does not occur.
12. Do not eat and drink in areas where hazardous materials are used or stored.
13. Place hazardous waste in containers labeled "Hazardous Waste" and never in regular trash, garbage, or waste containers.

Material Handling

This section provides basic guidance but does not cover all the requirements on material handling. Refer to appropriate sections of APM.

1. Use proper lifting and carrying techniques. When lifting, take a firm grip, secure good footing, place the feet a comfortable distance apart, bend the knees, and lift with the leg muscles.

2. Never carry a load that obstructs the vision.
3. Obtain help when needed. Use handcarts, cranes, or hoists for lifting heavy loads. Keep out from under suspended loads.
4. Use gloves or hand pads as required when handling materials especially when dealing with sharps, heavy loads, or hazardous materials.
5. Remove nails from loose lumber, bend the points down, or dispose of the lumber so that it will not become a hazard.
6. Never carry material or tools of any sort on the shoulder when working in proximity to exposed energized equipment. Carry long material, including lumber, in a horizontal position. Exercise caution to prevent any material or tools from accidentally contacting energized conductors or equipment.
7. Avoid handling loads from the street side of a vehicle if possible.

Hand Tools, Power Tools, and Equipment

This section provides basic guidance but does not cover all the requirements on all hand tools, power tools, and equipment. For more information refer to applicable OSHA standards including equipment manufacturers' instructions.

General

1. All tools and equipment shall be maintained in good condition.
2. Only appropriate tools shall be used for the job.
3. Damaged tools or equipment shall be removed from service and tagged "Out of Service" and deficiencies reported promptly to a supervisor.
4. Ensure that all guards and other protective devices are in proper places and adjusted prior to using any tools or equipment.
5. Tools shall be stored safely. Do not leave them where they can fall on someone or someone might trip over them.
6. Ensure that all exposed parts of line or countershafts, or collars, clutches, cut-off couplings and clutch pulleys 7 feet or less above floor or other normal working surface are appropriately guarded against the hazard of accidental contact.

7. All guards shall be appropriate for the hazards involved, secured in place, constructed of substantial material, and have surfaces free of hazardous projections.
8. Guards shall be used on equipment as required to prevent cuts and abrasions.
9. Personal jewelry should not be worn when operating a power tool. Long hair and loose clothing should be tucked away or otherwise secured.
10. Wear approved head, eye, ear, and foot protection, when operating air, hydraulic, or electric tools.

Hand Tools

11. Wrenches shall not be altered by the addition of handle-extensions or "cheaters."
12. Files shall be equipped with handles and not used to punch or pry.
13. A screwdriver shall not be used as a chisel.
14. Wheelbarrows shall not be pushed with handles in an upright position.
15. Carry tools safely and in a way that will not injure others nearby. Use a bucket, bag, or box. Do not carry tools in your pocket or pants belt.
16. Do not use extension handles on tools that were not designed for them.
17. Handles used (on paint rollers/bull floats) where they may contact energized electrical conductors, shall be constructed of non-conductive material or insulated with a non-conductive sheath whose electrical and mechanical characteristics provide the equivalent protection of a handle constructed of non-conductive material.

Power Tools

18. Ensure that power tools are operated only by trained employees. Portable electric power tools shall be double insulated or grounded.
19. Disconnect power tools from their power source before changing bits, blades, etc.
20. Secure rotary tools to keep them from rotating in case they stick.

21. Never hold a backup wrench in your hands when using a rotary wrench. Keep your hands clear while placing the wrench.
22. Always secure the socket of an impact wrench before using. Impact wrenches shall have a locking device for retaining the socket.
23. Point pneumatic tools toward the ground and remove the tools from the gun when they are not in use.
24. When handling tube extenders be careful of slipping rolls or cages.
25. Never hoist or lower a power tool by its power cord or hose.
26. Ensure that only non-conducting hoses of adequate strength for normal operating pressure are connected to hydraulic and pneumatic tools operated on or near energized lines or equipment.

Chipping Tools

27. Install a shield when using a chipping gun or portable grinder to protect anyone passing by.
28. Work so that chips do not fly toward other people.

Grinding Wheels and Hand Grinders

29. Inspect the wheel for cracks and chips frequently. Do not use a cracked or chipped wheel (perform the ring test).
30. Ensure that there is no more than 1/8 inch between the tool rest and the wheel.
31. Do not adjust the tool rest or hood while the tool is in motion.
32. Never grind on the side of a wheel unless it was specifically designed for that purpose.
33. Only qualified persons may replace a grinding wheel.
34. All grinding wheels and hand grinders shall have a machine guard and shield. Do not use a grinding tool without the guard in place.
35. Pedestal grinders shall be secured to the ground to prevent tipping or falling over.

Machine Tools

36. Before starting a machine, ensure that people and materials are clear.
37. Keep all the guards in place while operating the machine.

38. See that the work is properly secured before starting the machine, especially such machines as drill presses, milling machines, and threading machines.
39. Use a brush or metal hook to remove chips and debris from all machines. Never use your hands.
40. Never use your hands as a brake to stop a machine.
41. Keep materials clear of passageways and moving machinery.
42. Do not leave machines running unattended.
43. Do not clean or adjust any mechanical equipment while in motion unless such operations have been approved.

Machine Saws

44. Inspect the saw for kinks, cracks, and sharpness before starting.
45. Be sure that all guards are in good condition and securely fastened before starting the machine.
46. Leave all guards in place while sawing.
47. Never reach over or around a moving saw.
48. Push small pieces of work through with a stick or mechanical device. Do not use your hands.
49. Never crowd or twist power saws.
50. Disconnect the power before removing the saw or performing any maintenance on the saw.
51. Chain saws shall be equipped with a constant-pressure control that returns the saw to idling speed when released.
52. Chain saws shall have a clutch adjusted to prevent the chain drive from engaging at idling speed.
53. Table saws shall be equipped with an anti-kickback device during ripping operations.
54. Saw guards shall not be blocked open to prevent guards from functioning.

Concrete Power Tools

55. Powered and rotating type concrete trowel machines that are manually guided shall be equipped with a control switch that will automatically shut off the power whenever the operator removes his or her hands from the equipment handles (dead-man switch).

Pneumatic Tools

56. Safety clips are required on pneumatic tools to prevent dies from being accidentally expelled from the barrel.

57. Ensure that pneumatic nailers and staplers that operate at more than 100 psi of pressure have a safety device that prevents the tool from operating when the muzzle is not in contact with the surface.

58. All tools with air hoses having diameters larger than a 1/2 inch shall have a pressure reduction safety device at the source of compressed air.

59. Blow out the air hose to remove sand and other foreign material before attaching the hose to an air source.

Airless Spray Guns

60. Airless spray guns shall have an automatic or visible manual-release safety device or a diffuser nut and tip guard.

Powder Actuated Tools (PATs)

61. Ensure that the PAT tool meets ANSI A10.3 1977 standard or has a California approval number.

62. Ensure that the PAT operator is holding a valid operator's card.

63. Ensure that the containers are lockable and bear a label that says "Powder – Actuated Tools." The storage container shall be kept under lock and key.

64. Ensure that the PAT has the following:

- An operating and service manual
- A powder load and fastener chart
- An inspection and service record
- Repair and servicing tools

65. PATs shall not be loaded until ready for use.

66. Never point a loaded PAT at an empty tool or at anyone.

67. Warning signs stating "Powder – Actuated Tools in Use" shall be posted within 50 feet of PAT operation.

Compressed Gas and Oxygen

This section provides basic guidance for use and handling of compressed gas and oxygen equipment and does not cover all the requirements for welding and cutting.

1. Do not use compressed gases for any purpose other than that for which they were designed.
2. Never use compressed air to clean clothing or hair. Never allow compressed air to be turned against any employee for any reason.
3. Never allow oil or grease to come in contact with valves, regulators, or any other parts of oxygen cylinders or apparatus.
4. Never use compressed oxygen to purge pipelines, tanks, or any other confined area.
5. Never use compressed gases from a cylinder or cylinder manifold, or other container unless an acceptable pressure regulating device is installed on the cylinder, valve, or manifold.
6. Keep all connections to piping, regulators, and other appliances tight to prevent leakage.
7. Store oxygen cylinders separately from cylinders containing flammable gases (hydrogen, butane, propane, acetylene, etc.) and from oils, greases, or flammable liquids. A distance of at least 20 feet or a 5-foot high non-combustible barrier having a fire resistance rating of at least 1/2 hour shall be the minimum separation.
8. Store cylinders or containers of compressed gas in a suitable, well-ventilated location, properly secured in a vertical position with valve cap in place, except 1-ton chlorine cylinders which shall be stored horizontally.
9. Store cylinders of compressed gas in areas protected from excessive heat sources such as sparks and flames.
10. When cylinders or containers of compressed gas are not in use or in transit, they shall be secured vertically at all times and valves properly covered and protected.
11. If you need to move cylinders by hoist, crane, or derrick, then place them in a suitable cradle, or net. Do not use a sling unless it is specifically designed to keep a cylinder from slipping.
12. Never lift a cylinder of compressed gas by its cap.
13. Keep cylinder valves closed when moving and when the work is finished. Keep the valves of empty cylinders closed.

14. Compressed gas cylinders shall not be stored in areas that are exposed to sources of heat. Cylinders shall be secured at all times and valves properly covered and protected.
15. Compressed gas cylinders shall be securely fastened (by straps or welded chain) to an immovable object, e.g., a wall. Cylinders with regulators shall be individually secured.
16. Employees shall not roll cylinders or handle them by their valves.
17. Compressed gas cylinders not in use (not equipped with a regulator) shall have the safety cap in place.

Equipment and Vehicles

This section provides basic guidance only.

1. Inspect equipment and vehicles daily prior to use.
2. Always wear a seat belt and shoulder harness (if equipped) while operating vehicles, including cars, trucks, and field equipment. Observe proper speed limits and practice defensive driving.
3. Before starting to move a vehicle either forward or backward, ensure that no person or object is in the path of the vehicle.
4. Never ride or allow others to ride on pole dollies, trailers, fenders, running boards, side rails, or on top of vehicles. Always ride in the space provided.
5. Never ride or allow others to ride in the basket, bucket, or pin on the platform of an aerial lift truck which is traveling between work locations. Employees may ride for short moves at the work location to reposition the truck for a better boom angle, but only with the boom in the cradled position.

EXCEPTION: See APM Rule 167 for exceptions allowed for towering work.

6. Always shut off engines and set brakes prior to loading and unloading vehicles.
7. Before proceeding, always make certain that all loads are properly secured, and riders are properly located to prevent falling from the vehicle, and are not exposed to hazards from shifting loads.
8. Store or guard all sharp tools, such as saws, chisels, axes, knives, etc., carried on vehicles to prevent injury.

9. Never get on or off vehicles in motion.
10. Never permit more employees to ride on the driver's seat than the number for which the seat was constructed.
11. Never work under vehicles supported by jacks or chain hoists, without protective blocking that will prevent injury if jacks or hoists should fail.
12. When operating vehicles near trenches, excavations, and edges of elevated ground surfaces be sure to adhere to distance restrictions from edges to ensure ground integrity remains (e.g., free from potential collapse, sink holes, landslides). Ensure that employees are not inside a trench when the vehicle projects any of its components into the trench/excavation.
13. When parking on a grade, turn the front wheels all the way into the curb, as far as they will go to prevent the vehicle from rolling out from its parked position. Remember to turn the steering wheel towards the curbing if the vehicle is facing downhill or turn the wheel away from the curbing if the vehicle is facing uphill such that the back of the front tire is turned into the curbing. Use chocks, where provided, where there are no curbs or where other conditions require. Before leaving the vehicle, set the emergency brake and place the transmission in gear or parking position.
14. Never leave the controls of any vehicle or mobile equipment parked in such a position that it might coast or free wheel from its parked position.

Forklift

15. SCE employees use forklifts or industrial tow tractors at almost every job site. These rules shall be posted at each job site where forklifts are used. All employees are responsible for complying with the operating rules listed in APM General Rule 144, Powered Industrial Trucks.

Trenches, Excavations, and Earthwork

This section describes general safety procedures to be followed when working in and around trenches and excavation. For additional safety requirements follow appropriate OSHA regulations and APM rules.

1. Never enter a trench or excavation that is 5 feet or more in depth until adequate control systems are in place to prevent the collapse or failure of such trenches or open excavation.

2. Do not enter any trenches or excavations until they are examined and verified to be safe by a qualified person. Excavations shall be inspected by a qualified person daily and throughout the duration of the work.

3. Keep excavated material, spoil, or equipment away and no closer than 2 feet from the edge of trenches or excavations.

4. Always use proper stairway, ladder, or ramp that is secured in place to access any trenches or excavation that is 4 feet or more in depth. Access must be no more than 25 feet away from where you are occupying the trench or excavation.

5. Do not jump over open trenches. Always go around. Guardrails shall be installed when employees and equipment are required to cross over excavations that are at least 6 feet deep and 30 inches wide.

6. Before backfilling any excavation, ensure it is safe.

7. Always perform a visual inspection before backfilling any excavation to ensure the safety of your co-worker.

8. Never operate any excavating equipment near tops of cuts, banks, and cliffs if employees are working below.

Outdoor Heat Stress

This section provides basic guidance only. For more on outdoor heat stress prevention, refer to Corporate Heat Illness Prevention Program and APM.

1. Understand the symptoms and signs of heat stress-related disorders.

2. Understand conditions of heat stress, for example, high temperatures, high humidity, poor air movement, and radiant heat sources.

3. Do the following as precautionary measures:

   A. Drink plenty of water. Water may be supplemented with non-sugary, non-caffeinated, non-alcoholic beverages.

   B. Take frequent cool-down breaks, if work requires exertion.

   C. Heed warning signs, such as a pounding heart or shortness of breath, and stop to rest in a cool place.

D. Choose cooler morning or evening hours for the heaviest work.

4. Initiate a prompt rescue if you or your co-worker is in imminent danger of further injury. Refer to the APM, First Aid – Sections 1007 through 1009, the First Aid Response Guidelines Fact Sheet, and Heat Illness Prevention Program.

Attachment B. Example of Safety Information to Provide to Visitors

Visitor Guidelines

Safety is our Priority

Therefore it is important that you follow our safety rules and understand how to evacuate our facilities in the event of an emergency.

- Please follow our safety signs–
  - Signs are located throughout our facility.
- In the event of an emergency, if a–
  - Fire Alarm sounds, evacuate immediately.
  - Public Address announcement is made, listen carefully and follow directions as instructed.
- Evacuation routes are posted throughout the facilities–
  - As you reach your destination, note the nearest evacuation route.
  - In the event of an evacuation, your SCE host will lead you to your evacuation
  - assembly area in our parking lot.
  - If you have questions regarding the evacuation procedure at SCE, please direct
  - them to your SCE host.
  - During an evacuation, Life Safety Coordinators, in blue vests and helmets, are
  - stationed throughout the facility to provide assistance during the evacuation.
  - Remember, do not use the elevators!
- When an Earthquake strikes, remember to– Drop, Cover & Hold –in a safe place such as under a desk. If you are not near a desk, move away from windows to a corner and Drop, Cover & Hold until you are instructed to evacuate the building.
- Do not leave the SCE evacuation area until your SCE host has accounted for you and advises you that the area is safe for departure. Your safety is important to us.

For this facility (Name of Facility) report all emergencies including medical emergencies by picking up any phone and dialing <Number>. To ensure a complete transfer of information, do not hang up until instructed to do so.

Thank you for your support as we work to maintain an injury-free workplace.